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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

VOL. CLXII. No. 3128.] LONDON, APRIL 25, 1923. [75TH YEAR. PRICE 1s.

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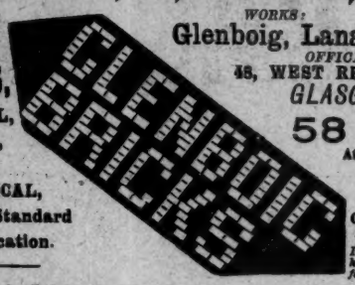

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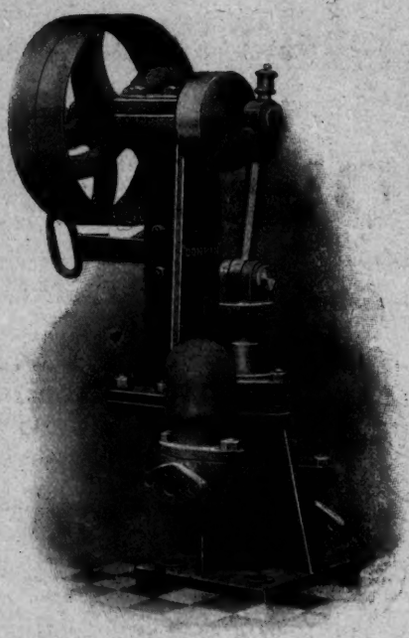

FIG. 536.

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VOL. CLXII., No. 3128.] WEDNESDAY, APRIL 25, 1923. [75TH YEAR.

EDITORIAL NOTES.

The Budget.

NEVER probably has a Chancellor of the Exchequer, just before making his annual fiscal statement in the House of Commons, received so much gratuitous advice as has Mr. Baldwin during the past two or three months. It came from all quarters; and had he accepted the counsel so generously, but more or less selfishly, given, he would have had to appear before the House with an enormous deficit. But last week he gave the country his decisions. There are to be no innovations in taxation; and he has distributed his favours with, it is largely conceded, very good discretion, though there are not a few grumblers. There is no question that industry and trade badly wanted more relief from taxation; and what has been done in this respect is modest, but helpful. A remission in income-tax of 6d. in the pound—from 5s. to 4s. 6d.—is not, in view of the height of the tax, anything to excite great jubilation; but still all payers will rejoice that they are receding even a little farther from the peak of the income-tax load that was necessitated by war conditions. Industry and traders especially are pleased, though they had hoped for more; and the reduction will make some difference to the net sums that the stock and share holders in the gas industry will receive. The benefit, of course, will only partially affect the current half-year's payments; but the full effect will be seen in the warrants for the second half of the year. The same applies to the manufacturing and trading concerns associated with the gas industry. They will also reap some advantage from the 50 p.ct. cut in the Corporation Profits Tax—from 1s. to 6d. in the pound. It is hoped that next year will see an end put to this unpopular form of taxation, which inflicts an extra burden upon industry and commerce, and is wholly unfair in its incidence. Of course, it does not apply to public utility concerns, which are exempt from the tax until the end of 1925—if it survives so long the heavy criticism which is being constantly levelled at it. The reductions in postal and telephone charges will be useful to trade; but all look back to the days of the penny post with great affection, and would heartily welcome their return. Fortunately, we have a Postmaster-General who knows how to win popular esteem; but prudence has urged him not to go too far without being fairly assured of the enabling wherewithal.

The Complete Gas Engineer.

THERE are higher ideas extant than there have ever been before regarding the mental equipment or qualifications and proficiency of the gas engineer. It is realized too that, though in a large gas-works there is devolution of duties to specialists, the gas engineer must have a sufficiently intimate knowledge of the work of each to enable him to interpret correctly the results of their work, and apply it to his own practices and the regulation of the entire works operations. The realization of all this is found in addresses, papers, and utterances of men in high responsible positions in the industry; the intention to achieve to greater perfection in the education and training of the gas engineers of the future is found in the educational plans that have been prepared by the collaboration of our own technical and commercial organizations and the central educational authority of the country. This denotes the recognition of the need to bring a higher efficiency into the industry as the best means of achieving progress, and thus security with about us a greater, more pressing, and constantly extending competition. The duty of procuring a higher competence in the responsible men in official position is not only a matter of the individual need of the industry to attain to a higher state of security, but it is an obligation incident to our position and capacity as an industry to serve the national welfare.

Much of this requirement in our chief official ranks was portrayed in an address that Mr. G. H. Gemmell, F.I.C., the Official Analyst to the North British Association of Gas Managers, gave last Saturday to the Scottish Junior Gas Association (Eastern District). By the superficial, it may be said that he went too far, or expects and prescribes too much. But those who think, and it need not be too profoundly, will see that he did not make any flights into imagination as to necessity, but that throughout his conceptions are perfectly consistent with current practical requirement and that of the future, so far as one can in the present visualize it. He gave to his address the title—"The Functions and Duties of the Chemist, and the Bearing of Chemistry on the Gas Industry." All the processes of the industry are rooted in chemistry. We cannot operate and govern any one of them without its aid. Hence it is impossible to over-estimate the importance of a knowledge of chemistry to the gas engineer, though he has at hand a staff to carry out all the routine chemical operations. Therefore, the men who are henceforth to occupy the leading positions in the industry must be those who are prepared to give time and study to the technology of the subject. If we look around to-day, with the view to ascertain who have accomplished most for the industry during the past few years, the result of the survey shows conclusively that the men who have contributed most to our latter-day progress, and have brought about greater economy and efficiency in production and utilization, are those who have been aided by their scientific, particularly chemical, knowledge. It is no use trying—it is foolish to try—to evade plain facts. Our progress in production and utilization defies any of the contradictions that nescience would advance.

It is not sought by Mr. Gemmell to set chemistry on a pedestal high above engineering qualification. His view as we understand it is the rational one that good engineering and good chemistry should go hand in hand; that the one should operate and develop by the aid of the other. The chemist should obtain the information as to the raw materials of industry that have to be treated—in the case of the gas industry, the coal, oil, coke, and so forth; and the engineer should conform his work and control his operations so that the best possible economic value in products will ensue. To obtain uniformly good results from a given set of conditions in respect of raw material, temperatures and plant must be worked in accordance with the findings of the chemist (who requires also to be acquainted with physical laws); and therefore upon him devolves a considerable responsibility in respect of supervision and control. There should be time, too, in the more imposing works for chemical investigation and discovery. Thus an engineer with supreme responsibility must have chemical and physical knowledge to enable him intelligently to take full advantage of the issues of the routine or research explorations of his chemical staff. We have heard of engineers with such little minds, and such small appreciation of the functions of their chemical staff, that they have rejected the recommendations that have been based upon the results of scientific work, simply because they did not fit in with their own limited knowledge

and predilection for traditional procedure. Where this continues, there will be a visible lag in progress, to the disadvantage of the undertaking and the community it serves. Appreciation and the desire to utilize the results of chemical and physical work are stronger in the man who himself has chemical and physical knowledge than in the man who has not. This all applies not only to the production of gas, but to the secondary products. Just as better values can be secured by knowing what one is purchasing in the way of raw materials, so better sales can be effected when one gets in the secondary products the best possible intrinsic properties without undue interference with those of the primary product.

Referring to tar, spent oxide, ammoniacal liquor, and sulphate of ammonia, Mr. Gemmell says: "The day is past "when a gas engineer is prepared to accept the test of the "value of those materials supplied by the buyers without a "check in his own laboratory, or by an independent ana-"lyst." We wish this were true in all cases; unfortunately it is not, oftentimes to the material disadvantage of the sellers. Cases are known where the improved prices obtained for ammoniacal liquor alone have more than paid for the establishment of a chemical laboratory, with a chemist and an assistant, who have soon made an impression upon the economy and efficiency of the works operations from start to finish. Engineers should not harbour the idea that the higher economies and efficiencies obtained are a reflection upon his own competence. The man shows the highest competence for his work who is strong enough to bring to his assistance any and every means of improving the state of his working balance-sheet. This can only be done by an increased knowledge of everything from coal and oil purchase, through supervision and control of processes, and on to the quantities and properties of the primary and secondary products. Mr. Gemmell says, and that rightly, that the engineer should be able to draw up a balance-sheet, showing on the one side the thermal value of the coal used, and on the other how many of the therms he retains in the gas, and what is lost by radiation and conduction. Of course, he must also know, in order to make a true balance-sheet, how many therms are retained in the bye-products. These are matters that involve much detailed work; and this the gas engineer cannot personally undertake. But there is satisfaction that the works must be of very limited character that cannot make it a good paying proposition to introduce the services of a man trained in works chemistry.

The works and the processes from beginning to end offer considerable scope for the introduction of new and profitable economies and efficiencies. There are many miscellaneous matters, and instances are given by Mr. Gemmell. There are refractories, which are costly; and therefore their maintenance is expensive, unless good qualities come to aid in the lessening of the expense. There is the question of purification. Contentment largely reigns here. And yet many engineers carry on the processes and purchase oxide without knowledge as to whether they are doing the most economical thing, and are obtaining the maximum efficiency to which the work and the undertaking are entitled. There is the boiler-house—still in many cases the seat of much inefficiency. There is the maintenance of the quality and composition of gas—not only owing to the necessity for conforming with certain standards, but to give the best service to the consumer, and to protect the plant from corrosive influences. There is also the testing of the appliances purchased by which the gas is to be applied to various purposes in the home, office, shop, and factory. Incidentally, in dealing with these miscellaneous matters, Mr. Gemmell expressed the view that in respect of gas production, he believes that progress lies in the complete gasification of coal by the agency of oxygen and steam. With oxygen at 1s. per 1000 c.ft. made direct from the air at the works, he believes this should be a practical proposition resulting in increased output per ton of coal and cheaper gas. He will have a good friend in Prof. Cobb.

The complete gas engineer is the man who can bring to his aid all available resources that will make the results of his operations more profitable in respect of the value he can supply for a given over-all cost. Whether a man can raise himself to that standard of personal efficiency which will enable him to do this depends much upon himself. We like the words with which Mr. Gemmell concluded his address to the Scottish Juniors: "The job of the man above you, "or a similar one, will one day be vacant. Can you take it "on?"

Cooker Advance.

When men's minds become concentrated on an effort to change for the better, either radically or by improvement in some detail, any method of accomplishing work or anything else, there is good ground for the belief that success will result. As we have previously observed, during the past few years there has been a revival of the study of the gas-cooker; and men have been working along their own selected lines to give us something better than we have hitherto had. All real achievement is welcome, both for its own sake and for the new energy that it inspires in others to endeavour to realize something better still. By such means, combined with the theoretical and practical knowledge and the experience of the workers, progress is effected.

It is because of this, and on account of the claims made for it, that we have recently drawn attention to the published information concerning the "New World" cooker. We have now had an opportunity of inspecting this new claimant for consideration, and of witnessing its operation. We are not going to label the cooker "*ne plus ultra*;" but we are in a position to say that, while in outward appearance it is much the same as other modern gas-cookers, in the vital parts and in methods there are fundamental departures from what has been, and that in respect of performance Radiation Limited do not appear to have erred in making any excessive claim. We have arrived at a stage now in the gas industry when it does not do for makers of gas-consuming appliances to prefer claims for efficiencies and performances that cannot be ratified by the growing tendency in the gas industry experimentally to prove the higher standards of efficacy ascribed to fresh introductions. The new training of our gas men, and the quest for the highest efficiencies in utilization as well as in production, induce the desire among those buying in quantity to check the economy and efficiency valuations placed by the manufacturers upon their products. When a firm of established reputation come before their patrons with high claims for a new appliance, and state that it is the product of their own technical research, supplemented by a large accumulated experience, being aware that their patrons have also advanced in the arts of technical research and experimental proving, they know how futile it would be to pitch claims beyond the realizable, and that to do so would be disparaging to their own standing. Thus it is that Radiation Limited tell us that they are satisfied that the length to which they have gone in the matter of claim in placing this "New World" cooker on the market will be justified by any practical test which puts it through its paces in the designed manner of operation.

There is an old idea still resident in some minds that gas undertakings are rather partial to wasteful gas-consuming appliances; while the contrary is the truth. The men who control gas undertakings are not so foolish as not to appreciate that good efficiency and consumers' satisfaction are the best assurance for the maintenance and expansion of business. The first impression that we had in investigating the working conditions of the new cooker was that the makers have sought to place in the hands of consumers the means of effecting economy and of securing cooking efficiency, without imposing additional labour upon them, but, on the contrary, lessening it, while giving them certainty of result. The saving claimed in gas at present prices is such that it is confidently asserted that the cost for a given operation will be no more than it was with gas at pre-war prices, and the work will be done with greater satisfaction. This means that what the consumers have lost at the gas-producing end through higher costs, they would, so far as cooking goes, obtain compensation for through the economies in gas consumption. According to this, assuming 500 B.Th.U. gas at 9d. per therm now, and 2s. 6d. per 1000 c.ft. before the war, there should be an over-all reduction of 33⅓ p.ct. in consumption, in order to make 3⅓ therms do the work that 5 therms did before. This puts the matter perhaps more definitely than the makers have presented it; but we see no reason why the cooker should not respond, used as intended, to the suggested economy—at any rate, that is the view formed from, confessedly, a short investigation of performance. Economy and simplification of cooking operations have been combined. The descriptive article in another part of this issue points out how this is accomplished by the hotplate burners. The duplex taps, for example, are so devised that a quarter turn gives the full amount of gas for maximum requirements, a second quarter turn reduces the gas delivery to simmering needs, while a further small turn

lessens the quantity of gas to a point which is useful for many cooking operations requiring a continuous mild heat. Beyond this the gas flow cannot be reduced; and therefore it is necessary to turn the tap back again to extinguish the flames. There can, of course, be regulation for any calorific quality of gas within the limits of current declared values. The "Simplex" tap is made for the "full-on" and "simmering" positions only. For the series of cookers, the hot-plates and the grids are made in units, so that replacements are simple, and do not require the carrying of a large varied stock—in fact, interchangeability runs through the series save in the width of the ovens. Further saving is effected by the burners having an open space, in which there is free combustion, between the burner and the utensil above. There has been a departure here from the ring burner; but when one examines the incidence of the flames upon the bottom of the vessel above, and the area over which the flames spread, it is obvious that there cannot be in this case that concentration of heat which critics affirm is a marked drawback to some cooking operations. Before there is condemnation in this respect, there should be trial in order to prove or disprove the point.

Then in regard to the oven, the automatic regulation of temperature provided by the "Regulo" heat controller, or the consumption adjustments allowed by the "Accurette" graduated dial tap, recommend themselves, in that they largely eliminate personal attention, and so minimize the liability of the individual to error in the matter of the requisite temperatures for specific operations. This must be a considerable relief in cooking. When the "Regulo" and its use become known, we feel confident that the small additional expense that its incorporation entails will not deter its rise in popularity. It will be found an aid to good effect that will meet with public approval. A feature that particularly interested us is the claim to uniform heating in all parts of the oven. This, too, was investigated; and further heat economy was found. The situation of the row of gas-jets at the back of the oven, and the flue-outlet being at the bottom, cause the heated air and products of combustion to circulate, and thus render a greater heating duty before escaping. This means heat economy; and it contributes to a temperature uniformity which is not ordinarily obtained, so making it unnecessary, as is commonly the case, to shift the food being cooked from the high-temperature upper part of the oven to the low-temperature bottom part. By the new method, there is labour-saving through the lessened attention required, and good cooking results.

Without entering into general details in this article, the points made are sufficient to show that the attempt to effect a beneficial departure from former lines of cooker design has produced success. This acknowledgment is deserved. It sets one thinking also as to how the policy of amalgamation of so many of our leading gas-stove makers has worked out since the days when—this was at the advent of Radiation Limited—there was natural distrust of a big combination, with its possibilities of acting as a monopoly. Many reserved their opinion till time revealed the intentions and effect of the combine. Gradually, there has been evidence of the sincerity of the purposes which Radiation announced as the motive of "getting together." Standardization has proved a slow thing; but there has been a deliberateness in this which has made for thoroughness. Standard gas-grates and various other standard apparatus have been followed by the "New World" cooker, which must, of course, be tried and weighed in the balance before its claims can be fully admitted. But as we have said, it is evidently the outcome of much earnest effort and of the pooling of many varied aptitudes and experiences; and it has every appearance of representing a genuine endeavour to elevate gas-cooker design. In other directions the fears of 1919 have not been realized. Radiation has inevitably needed a long time to get its house in order, effect internal economies, and eliminate loss through undue competition among its constituent firms. Competition of that kind has now been cut down to a healthy but inexpensive emulation, and the concrete result is found in two successive reductions of prices. Above and beyond these specific advantages, the general line of action of the Company has shown that the sinister results at one time feared have not materialized, and that it is no more to the interest of Radiation than to that of the other sections of the industry that they should materialize. As an example, the recent address of the Chairman (Mr. H. James Yates) to the shareholders demonstrated that the interest and purpose of Radiation were *bonâ fide* in the defence and for the benefit of gas as a whole, and that the Company were in a position to co-operate loyally in furthering the common interests of the industry. Of course, it is a business concern, with goods to sell and dividends to earn; and it makes no claim to be a philanthropic institution. But the work which, for its own advantage as a business concern, it has done and is doing—its general advertising and the popularizing of its apparatus—is all helping to exert a public influence which cannot stop short at the immediate benefit to themselves, but must directly and indirectly work to the advantage of the industry as a whole.

The New Railway Rates.

Some additional reductions in railway rates for goods were announced last week by the Railway Managers' Association. These will particularly benefit the agricultural industry and generally trading; but there is great disappointment in what may be described as the heavy industries—those in which the gas industry is especially concerned, and the conditions of which, be they good or bad, react upon those of the industries they serve. But first as to the concessions that have been made. Agricultural products by goods train have been reduced from 75 to 50 p.ct. above pre-war rates; but lime and limestone, manure, and gas lime remain at the present rate. Other goods train traffic has been reduced from 75 to 60 p.ct. above pre-war rates. In respect, however, of traffic in Class "A," coal, coke, and patent fuel have been definitely excluded from all participation in the rebates; and so have iron ore, ironstone, &c., for blast-furnaces and steel works, limestone for chemical works and glass works, and agricultural manure. The reductions apply to traffic in Class "B," other than manufactured fuel, iron and steel, ferro-silicon, &c., chromo iron ore, &c., for blast-furnaces and steel works, as well as agricultural manure. The concessions also affect traffic in Class "C," other than iron and steel and agricultural manure. In other traffic and small parcels, useful concessions have been made. Altogether, it is estimated that the cuts will cost the railway companies upwards of £9,000,000 per annum.

The gas industry, in company with the coal and iron and steel industries, has very good cause to grumble; for it is an immense contributor to the goods traffic business of the companies. The exclusion of coal and coke from the benefit of the 15 p.ct. reduction is a matter of considerable importance to gas undertakings. The Mining Association are deeply disappointed over, and have given vent to their feelings on, the omission of solid fuels from the list of commodities which are to benefit. There is no question about coal being the key industry to practically the whole of the nation's industries; and therefore it is considered, and rightly, by the mineowners that an important opportunity has been lost for relieving one of the chief burdens that are handicapping the trade of the country. In the comment of the mineowners, it is stated that, notwithstanding the repeated attempts to bring coal carriage rates down to what is considered a reasonable level, these still remain at 60 p.ct. above the charges prevailing up to the end of 1919, *plus* a 2d. flat rate upon coal, which operates very harshly in the case of short-distance traffic. For some considerable time, it has been urged that rates should be brought down to 50 p.ct. above the old level, and that the lump increase should be abolished altogether. The coalowners claim that reduced charges on railborne fuel would make for a greater volume of this class of traffic, and an increase in railway receipts; and in support of this they have drawn attention to the comparative figures for 1922 and the preceding year. It is estimated that the flat charge for coal carriage decreased from 5s. to 4s. per ton for this period, despite which the railways carried 200 million tons in the latter period, as against 128 million tons, while the revenue increased from £32,000,000 sterling to £40,400,000. Representatives of the iron and steel industry have also voiced their disappointment. It is submitted by them that their industry is an exceptionally good customer of the railways; and therefore they consider that it has been shabbily treated. For every ton of steel manufactured, six or seven tons of materials have to be moved over the railways; and it is calculated that the industry normally accounts for 25 p.ct. of the tonnage carried over the railways. It is held that the railways could not afford the rate reductions that are now being made were it not for the heavy quantities of coal and iron and steel materials that they are now conveying. The industries providing this traffic are therefore worthy of better consideration.

In defending the abbreviations of the list of goods that will benefit from the concessions, the railway companies state that their wages bills are to-day about 136 p.ct. above the pre-war level. Wages form about two-thirds of the total costs. On an average, too, about 70 p.ct. more is being paid for all materials that the companies have to purchase; and it is also stated that generally the companies are not earning the same amount of net revenue as in 1913. But they say that, in the event of the present negotiations with the trade unions for wage reductions being successful, they will be prepared to make further reductions. The statement as to wages being still 136 p.ct. above pre-war level shows that the employees of the railways are in a much more favoured position than the members of most other trade unions, though we do not forget that some grades of the employees were ill-paid before the war. On the other hand, the holders of railway stock are receiving more in the way of dividend than prior to the war. It has been pointed out to the companies that they have a depreciation reserve fund of nearly £150,000,000, and that the amalgamations have placed them in a much stronger economic position. The Federation of British Industries, who are pressing for a general reduction of railway rates as from Aug. 1 next, have called attention to the fact that the traffic receipts for the first quarter of this year show clearly that, in the three groups serving the important industrial areas of the Midlands and the North, they are, with the reduced rates, steadily rising above the figures for the corresponding dates in 1922, and that the upward movement in traffic commenced immediately after the general reduction of rates and charges on Aug. 1 last, and has continued steadily ever since. This improvement in the volume of traffic is borne out by the official ton-mile figures as far as these are available; and it seems a legitimate inference that the rate reductions made in 1922 have been largely responsible for it.

The last word has not been spoken on the question of the new rate reductions, and the omissions from them; they will only accentuate the pressure that will now be brought to bear on the railway companies. Even the agricultural interests are not satisfied.

Standard Price Revision.

The *agenda* of the London County Council gives the information that the Public Control Committee have retained Mr. Arthur Valon, M.Inst.C.E., to advise generally as to whether, upon the information at present available, there is a *primâ facie* case for applying to the Board of Trade for a revision of the standard prices charged by the various companies supplying the London area, and, if so, then to assist in the preparation of the case should the Council decide to proceed in the matter.

Coal Output and Need.

The question as to whether, if, or when, we return to normal industrial conditions, the coal output would be sufficient, continues to agitate the minds of not a few men. Everything points to the fact that it would not. The total production of coal for the fifty-two weeks ended March 24 last was 260,641,900 tons—a deficit of 26,769,969 tons on the 1913 figure. The average weekly production during those fifty-two weeks was 5,012,344 tons—a deficit of 514,807 tons on the weekly average of 1913. Yet the Secretary for Mines has stated that there are 40,000 more men employed in and about the mines than in 1913. The plain fact of the situation is that the output of 1913 would not now nearly satisfy the demands of a normal year. Inland consumption already exceeds that of 1913; and as industry recovers further, the demand will increase considerably. It was calculated before the war that the normal average annual increase in consumption was about 5 million tons. On this basis there would be required—not the pre-war output of 287 million tons, but about 50 million tons more. It is apparent that under the seven-hour system such a demand could not be satisfied. The failure of the output of coal to keep pace with the increasing demand must inevitably mean another check to national recovery. Increased production, on the other hand, would not only stimulate the revival of other industries, but, by both extending the receipts from sales and reducing the average cost of production per ton, would automatically react with two-fold effect upon wages to the advantage of the miners themselves.

A Good Quarter.

The figure given in the previous paragraph as to the coal output for the year ended at March 24 last includes the production for the first quarter of this year, which was exceptionally good. It amounted to 71,042,500 tons, while the previous three quarters gave respectively 68,760,300 tons, 63,335,800 tons, and 57,551,800 tons. If we take the 71,042,500 tons of the past quarter as the basis for calculating the probable output for the current year, the total arrived at would be well above pre-war years. This looks more hopeful, seeing that the past quarter included the shortest month, two holiday periods, and the beginning of the strike in South Wales. At March 31, there were 1,147,800 wage earners at the mines; and only in the first and last weeks of the quarter, the weekly production fell below 5¼ million tons.

The Railway Shopmen's Reduction.

The complicated position that has been created in the railway world regarding the proposal to reduce the war bonus of the railway shopmen by 6s. 6d. per week, and the decision of a special delegate meeting of the National Union of Railwaymen to call a national railway strike if the Companies enforced the reduction, has not so far been relaxed. It will be remembered that Mr. J. H. Thomas, the General Secretary of the N.U.R., has declared the decision of the delegate meeting to be a violation of the principles of trade unionism and of collective bargaining. It has now been announced that the executives of the craft unions have voted against the acceptance of the Companies' offer that the 6s. 6d. should be withdrawn in two parts—3s. 6d. per week immediately, and the remaining 3s. after an interval of three months. At a meeting last week between the railway managers and the representatives of the crafts and labourers' unions, modified terms were put forward, which are to be submitted to the members of the crafts unions on a ballot vote. The new terms have not yet been made public; but the Executive Committee of the A.E.U. have already decided that they cannot submit the terms to a ballot of the members, as in their opinion no case has been made out for a reduction of wages. It will be interesting to see whether the suggestion put forward by Mr. Thomas has been adopted by the Companies—that the men employed in the railway shops should be brought within the conciliation clauses of the Transport Act, and wage changes be considered by the machinery of the Central and National Wages Board.

A "Captive Fire" Challenge.—Attention may be called to a challenge which appears on p. III. of this issue. We are a conservative nation; but it would appear that the virtue of such conservatism has been exceeded in this case. It would be a pity if the inventor, through lack of appreciation here, was forced to make his headquarters elsewhere.

Wills.—Colonel Larkworthy, of Malvern, who was a Director of the Worcester New Gas Light Company, left estate of the gross value of £37,785, with net personalty £26,007. Mr. Harry Croom-Johnson, a Director of the Wrexham Gas Company, left estate of the value of £14,128, with net personalty £9170.

Manchester District Institution of Gas Engineers.—The 195th quarterly meeting of the Institution—under the Presidency of Mr. R. E. Gibson, M.Inst.C.E.—will be held at the Exchange Station Hotel, Liverpool, on Friday, May 11, at 11.30, when a paper on "The Maintenance Costs of Vertical Retorts" will be read by Mr. William Buckley, of Manchester. On the invitation of the Chairman and Directors of the Liverpool Gas Company, the members will take lunch in the hotel, and afterwards inspect the Garston works of the Company.

Thermal Reactions of Coal During Carbonization.

Mr. Joseph D. Davis has presented a paper to the American Chemical Society, in which the heat of carbonization of coal is discussed, and various methods which have been used in its estimation are compared and criticized. A method for indicating the heat of carbonization based on the relative heating rates of coal and coke when heated under the same conditions, is applied to seven typical American coals. This method is qualitative, the results being given in terms of temperature differences between coal and coke throughout the carbonization range. An attempt is made to correlate these results with net reaction heats determined for the same coals in a calorimeter; the expectation being that the coals might fall into the same order as regards exothermicity. This was not the case, principally because comparatively arge thermal effects, sensible and latent heats of the distillation products, are involved in the heating rate method and not in the calorimetric method; and these do not vary with the rank of the coal in the same way as the reaction heats.

PERSONAL.

It is a relief to be able to record that the following message was received last Sunday night by Mr. J. H. Ellis, Chairman of the Plymouth Gas Company, from his son, Major Ellis, at Kohat: "Mollie in safe hands. Restoration imminent." Miss Ellis (aged seventeen) was kidnapped on the Indian Frontier, and her mother, Major Ellis's wife, was murdered by raiders, as stated in last week's "JOURNAL." Happily Miss Ellis is uninjured.

The wedding took place last Thursday, at St. Michael's, Bishops Stortford, of Mr. CLIFFORD ADEY KING, younger son of the late Mr. Walter King and Mrs. King, of Frinton, and Nora, youngest daughter of the late Mr. John Square Brunskill and of Mrs. Brunskill, of Bishops Stortford. Canon H. T. Lane, Vicar of Bishops Stortford, officiated, assisted by the Rev. E. L. L. McClintock, Rector of Frinton. Mr. King is one of the Managing Directors of Walter King, Ltd.

Mr. F. G. SHAW, the Gas Engineer at Buxton, has been nominated for a seat on the Council of the Local Government Officers' Association. He is Chairman of the Buxton branch of the Association.

Mr. T. W. TIPLADY, Gas Manager to the Bakewell Urban District Council, is in hospital, having undergone an operation for appendicitis.

Dr. EDWARD P. HYDE, who in 1908 organized the Nela Research Laboratories, Cleveland, Ohio, and who for the past few years has occupied the position of Director of Research of the National Lamp Works of the General Electric Company, has tendered his resignation, to take effect on June 30 next. Dr. Hyde, who has been active in scientific and technical affairs for a number of years, has decided to take a prolonged rest abroad. He will temporarily discontinue many of his activities in the scientific and engineering societies, but will retain his office of President of the International Commission on Illumination until its plenary meeting, which is scheduled to be held in the United States in 1924.

There was an interesting gathering in the Board Room of the Derby Gas Light and Coke Company on Friday afternoon, when two of the leading officials, Mr. H. BULLIVANT (the Secretary) and Mr. S. WEBSTER (the Chief of the Clerical Staff) were the recipients of handsome presents, on the occasion of the reaching of their jubilee—each having been in the service of the Company for half-a-century. The General Manager and Engineer (Mr. J. Ferguson Bell) occupied the chair, and explained that they had gathered together to celebrate the completion of fifty years' service by Mr. Bullivant, who for nearly half of this period had held the important position of Secretary, discharging his onerous duties with great credit to himself and the utmost satisfaction of the Directors; and also to honour another veteran, Mr. Webster. Mr. Bullivant had, in the course of his duties, been brought into close touch with the public, with whom he had been very popular; and the staff felt they could not allow such an auspicious event to pass without some practical expression of appreciation for all that Mr. Bullivant had done for them in the past. Obviously the position of Secretary to the Derby Gas Company was one that conduced to longevity, as the first Secretary, Mr. Isaac Fisher, served for over thirty years, before retiring at the ripe old age of 94. Mr. Fisher was succeeded by his son, Mr. Richard Fisher, who served the Company faithfully and well for over half-a-century, and they were delighted to know that, despite his 94 years, he was still in the enjoyment of fairly good health. Had it not been for the services of the older members of the staff, they could not have carried on so well as they did during the strenuous years of the war. The Directors' policy, he might say, was that those who had borne the heat and burden of the day, should be kept on as long as they could discharge their duties; and that when they retired through old age and infirmity, provision should be made for them. This considerate treatment had brought its own reward, because the Company had as loyal a staff as any gas company in the country. Mr. Bullivant believed that unity was strength. The kindly consideration of Mr. Bullivant towards the staff had always been highly appreciated; and he (Mr. Bell) asked him, on their behalf, to accept a handsome arm chair and bassock. They hoped he would still be spared to them for many years to come. The presentation was supported by Mr. S. Webster, Mr. Roland Fisher (Resident Manager at the Litchurch Gas-Works), Mr. J. Timms (retired Auditor), and Mr. J. P. M'Crae (Assistant Engineer), each of whom heartily congratulated the Secretary on his sixty-fifth birthday and fifty years' excellent service with the Company. Mr. Harry Clark (Distribution Superintendent) also joined in the congratulations, and said that one of the outstanding features of the departmental control was the splendid manner in which the Secretary and his staff worked with the distribution department. A great deal of this smooth working was due to the genial Secretary. Mr. Bullivant, in accepting the gift, said it was an extraordinary coincidence that two members of the same department should complete their fifty years' service at the same time. Mr. Bullivant then presented a beautiful dining-room clock to Mr. S. Webster, and remarked that during the many years he had been associated with the Company Mr. Webster had been his right-hand man. Mr. Bell also paid eloquent tribute to Mr. Webster's services. Mr. Webster suitably returned thanks for the gift and for the kind remarks made.

ELECTRICITY SUPPLY MEMORANDA.

IN the "Memoranda" last week, brief reference was made to the fuel and thermal efficiency statistics that the Electricity Commissioners have issued for 536 generating stations; the data applying to the year ended March 31, 1922.

Data from Steam-Driven Stations. Much comment has been made on these in the engineering papers. We agree that the figures show the economy which is to be obtained by generating in large stations, and the wastefulness of the small ones, if steam-driven in the circumstance of having a boiler plant for this one purpose only; they also show how low is the thermal efficiency of electricity production even under the most favourable of conditions. But one cannot draw many general conclusions from the data. So much depends upon circumstances. The present big stations have super-districts to supply; the small ones have not. A super-station supplying areas of different characteristics, with considerable stretches of distribution cable without a customer, might find itself in an inferior position to the large station with a good concentration of day industrial demand and night lighting load. The figures for the existing top class of steam-driven station show that little more can be expected in the way of fuel economy, even if every favourable consideration be accorded. There is a limit to attainable economy, and this limit must about be reached with a fuel consumption of 1·74 lbs. per unit generated, and a thermal efficiency of 17·2 p.ct. This is at one of the two stations classified as A, and having an output of over 200 million units a year. A curious thing is that the average consumption at the two stations is 2·10 lbs. per unit; so that at the one the fuel consumption being 1·74 lbs., at the other it must be 2·56 lbs. But we find in group "C"—between 50 and 100 millions output—that the "lowest fuel consumption at any station per unit generated" is 1·7 lbs., while the average is 2·8 lbs. There we have a much smaller station equalling the fuel consumption of the larger station. The highest thermal efficiency in this group is 16·5 p.ct. So we go on until in group "F"—between 5 and 10 millions output—we get an average fuel consumption of 3·98 lbs. In this group the lowest fuel consumption is 2·8 lbs.; the highest thermal efficiency for any station being 11·17 p.ct. Then there is a marked ascent from group G—2½ million to 5 million output—with an average fuel consumption of 5·03 lbs., until we get to group L, with an output between 50,000 and 100,000 units, and an average consumption of 20·9 lbs. In group G, the highest thermal efficiency is 11·21 p.ct.; in group L 4·1 p.ct. But even in group L, there is a station with a fuel consumption of 6·8 lbs.; and in the stations with an output below 50,000 units, one with a consumption of 4·44 lbs.

Sizes of the Stations. In the group of steam stations, there are 396; and the total number of units generated during the year was 4,732,824,434. The total fuel consumed was 6,577,587 tons; and the average fuel consumption, 3·11 lbs. per unit generated. The grouping is lettered from A to M; and combining items from two of the tables, we find the following are the numbers and the outputs as classified, together with the highest thermal efficiency for any station:

Group.	No. of Stations.	Units Generated.	Highest Thermal Efficiency (Approx.) P.Ct.
A	2	Over 200 millions	17·20
B	7	Between 100 & 200 millions	15·25
C	10	" 50 & 100 "	16·50
D	25	" 25 & 50 "	14·10
E	65	" 10 & 25 "	15·20
F	51	" 5 & 10 "	11·17
G	48	" 2½ & 5 "	11·21
H	74	" 1 & 2½ "	9·12
I	39	" 500,000 & 1,000,000	7·20
J	26	" 250,000 & 500,000	5·80
K	22	" 100,000 & 250,000	6·85
L	18	" 50,000 & 100,000	4·10
M	9	Under 50,000	6·07

Gas-Producer Stations. For their size, the gas-producer stations beat the steam-driven stations hollow in the matter of fuel economy. There are no stations in this section qualified by output to be included in the groupings A to G. But there are two stations in H, 4 in I, 14 in J, 19 in K, 15 in L, and 6 in M—60 in all, generating 14,952,709 units, with a fuel consumption of 17,668 tons, or an average of 2·64 lbs. There we have for these small stations an average fuel consumption of 0·47 lb. per unit below the average for the steam-driven stations. In group K the lowest fuel consumption was 1·39 lb., which is a superior showing to the 1·74 lb. of the best of the steam-driven stations; and the thermal efficiency was 15·6. We have not the slightest doubt that the fuel was of a cheaper variety than that used at the "A" steam-driven stations. In thermal efficiency, these small producer-gas stations vie with the best of the steam-driven stations. From H to L the producer-gas stations showed thermal efficiencies of 15·12, 11·25, 12·44, 15·6, 12·3, and 7·95 p.ct.

Oil-Engine and Other Stations.

There are 52 stations using oil-engines, and generating 31,551,075 units. The total fuel consumed is 29,396 tons; and the average fuel consumption per unit generated is 2·08 lbs. With one exception, the fuel consumption in the various groups ranges from 1·65 lb. to 1·9 lb.—the exception being 3·16 lbs. The lowest fuel consumption at any station was 0·65 lb. In four of the groups, the highest thermal efficiency ranged from 27·45 to 29·15 p.ct. In the remaining two groups, the highest thermal efficiency was only 8·56 and 12·29 p.ct. There were 17 plants using waste heat, and producing 54,628,405 units; 30 destructor plants, producing 17,728,350 units; 19 town-gas engine plants, producing 3,874,029 units; and 22 water-power plants, producing 29,107,036 units.

Electric Cooking Advice.

Everybody is aware that electric heat is very expensive. It is well known, too, that, even if the purpose to which it is applied is one in which a high thermal efficiency can be obtained, it is considerably more costly than other agents. Electricity for heating purposes stands very much in the rear in the matter of economical service. Electrical men struggle hard to devise and show means whereby savings may be effected; and so make the conditions of use more onerous than they would otherwise be. Gas men are also always seeking after a higher efficiency in the appliances manufactured for utilizing gas. The way, however, they prefer is not to claim more attention from the consumer, but to effect structural changes that will achieve the desired end. We know that a difficulty of electrical operation in connection with cooking is that only three or four fixed heats are available; whereas with gas there can be regulation of heat within a long range for any desired purpose. A firm of electric-stove makers have recently issued a card of instructions to consumers, an object of which is to advise them how to economize. One piece of advice appears to us to be a bit crude. It refers to the hotplate, where the efficiency is relatively low, and where the heating elements deteriorate. It is suggested that for economy purposes, two or more pans should be brought to the boil on two boiling-plates, and then that one plate should be switched-off, and the pans be kept boiling on one plate by making them touch each other. It is much better to be able to adjust a gas-tap (or in the case of electricity, a switch), so that each pan can be kept boiling over its own ring. Where three vessels are put together over one heating element, upward channels are formed between them through which heat escapes. Another recommendation is that the oven door should be opened as little as possible. This is an old recommendation; and it is a very good one. But such advice will not be greatly heeded. There is a natural propensity on the part of the cook to see for herself how things are going on. Commenting on this recommendation, the writer of "Cooking and Heating Notes" in the "Electrical Times" says "the housewife who will only take the initial trouble to assure herself by experience that cooking with an electric cooker can be done by the clock without the necessity of looking into the oven will have cause to congratulate herself thereafter. But though this advice is given as to not opening the oven door, and the point is made that cooking can be done by the clock and the switches, lower down in the article we read that "meat pies and fruit tarts require a temperature of 330° to 350° Fahr., and should be put in near the top of the oven until slightly brown, when the heat should be reduced, and the pies removed to a lower shelf away from the effects of browning till the fruit or meat is cooked through. A temperature of 230° to 250° Fahr. is sufficient for this." Again, we read that "rich fruit cakes should be removed from the top of the oven when well risen." Now these operations cannot be performed by merely looking at the clock, and operating the switches. Something must be opened to get at the pies, cakes, &c., in order to remove them from the part of the oven where there is the greatest heat to another lower temperature part. What is stated, too, shows that the heat in the oven is not uniform; it is not equally distributed. There must be a concentrated heat near the elements. In the modern gas-cooker, there have been successful attempts to get an even heat throughout the oven. The character of the source of heating, too, gives a much better distribution of heat than in the case of the electric heating element.

Need of the Electrical Industry.

Apparently, in the opinion of the "Electrical Times," the Salesmen's Conferences that have been organized by the Electrical Development Association are not (*plus* experience) sufficient for the making of good salesmen. It is said by our contemporary that "what the electrical industry needs is a host of canvassers. At present it has only a handful at work, and less than a dozen of these have had any systematic training." The remedy is the creation of salesmen. Not only this, so writes our contemporary: "We must create a standard of salesmanship. We must accumulate, sift, arrange, and publish arguments, data, and information bearing on the advantages of electric appliances and electric service; their over-all economy, convenience, comfort, luxury, labour-saving. Electricity is the greatest practical boon that science has given to the present generation. It affords the salesman unlimited scope." From this, it would seem the industry is in a very bad way. Its sales organizations are wrong. The Electrical Development Association has not been doing its work properly in accumulating, sifting, arranging and publishing arguments, &c. But what in the name of commonsense is the good of troubling about salesmen? If "electricity is the greatest practical boon that science has given to the present generation" for (let us say) heating and cooking, why does it not forge ahead unaided by anything but its own virtues? Instead of that, it seems to need super salesmen laboriously to push it on.

A School of Electrical Salesmanship.

However, believing that something more is wanted, our contemporary proposes the foundation of a school of salesmanship, which should provide an intensive course—lasting (say) four weeks. Stress was laid by it on confining the pupils to young men already in the employ of electricity supply departments or of electrical contractors and retailers. The students could in turn deliver lectures to their fellow employees. The fee suggested was £10 for the course, to be paid by the employer, who would also furnish travelling expenses and subsistence allowance, on condition that the student remained in his employ for a specified period, and engaged to instruct his fellow workers locally. It was reckoned that ten courses, each handling a batch of fifty pupils, could be held in a year—total 500 students per annum. An income of £5000 should suffice to provide an all-time principal and eight or ten part-time lecturers, each with the highest repute in his own subjects, and leave more than enough for establishment charges. Lectures would occupy each morning; and the afternoons would be devoted to visits to showrooms, all-electric houses, cookery demonstrations, small factories, &c. There was much correspondence after the scheme was published. Some approved; others were not enamoured of the practicability of the scheme. Of one thing we are quite certain, the E.D.A. would like to have the handling of that £5000.

MIDLAND JUNIOR GAS ASSOCIATION.

Visit to the Works of Messrs. Gibbons Bros., Ltd.

A large party of members travelled to Dudley on Saturday, April 14, to inspect the works of Messrs. Gibbons Bros., Ltd., manufacturers of retorts, charging machinery, and other gas-making plant. They were met at Dudley Station by motors, which conveyed them to the Dibdale Works, where they were received by Directors and departmental heads, consisting of Messrs. Bennett, Allen, Stanton, Van Marle, J. C. Green, Lewis, W. E. Green, and W. E. Gibbons, who proceeded to conduct them through the works.

In the machine shops, the visitors were interested to observe an electrically-operated charging and discharging machine in course of construction, and also a Gibbons-Van Marle charging machine, for use with muffles and furnaces. This machine can be hand operated or electrically driven. A water-sealed muffle furnace for the bright annealing of brass was noted.

The Dibdale fireclay and retort works next received attention. Here the visitors watched the treatment of the silica rock (81 p.ct. silica) mined in the locality at the Company's own pits, which also produce coal for their use, and are in communication with the works by an endless conveyor. They saw the now dismantled plant by which formerly the Company made their own gas for lighting. Proceeding into the mill, the visitors witnessed the raw material being brought in, and then ground, mixed, and tempered, before being moulded into retorts by means of hydraulic or steam presses. A retort was actually seen made and transferred to the drying room, where it remains for periods of from three to eight weeks before going into the kilns. The pyrometer room, the kilns, and the laboratories were inspected.

The conveyances then took the party on to the firebrick works at Barrow, where the making of the firebricks for sectional retorts was watched with keen interest. These bricks are of practically pure silica (98 p.ct.), which comes from the Company's pits at Llangollen. Another short journey took the members to the constructional works, where they were particularly impressed with the automatic riveting machines and the different steel work in course of construction.

On returning to the Saracen's Head Hotel, Dudley, high tea was served, under the chairmanship of Mr. Bennett, who expressed the pleasure of the firm at seeing so many members attending to inspect the works. He hoped all of them had Gibbons settings; if not, it was their misfortune. As a slight memento of the visit, they asked the visitors to accept a small model of a retort and mouthpiece.

The President (Mr. C. F. W. Rendle) moved a hearty vote of thanks to Mr. Bennett and his co-Directors for their kindness and hospitality, and assured them that the members had appreciated the opportunity of visiting the works. The Senior Vice-President (Mr. L. Thomas) seconded the vote, which was cordially passed, and acknowledged by Mr. Bennett.

Society of British Gas Industries.—The Society will hold their annual general meeting at the Holborn Restaurant on Thursday, May 10. The general business meeting at 2.30 will be followed at 3.30 by the address of the President (the Right Hon. Lord Riddell), and the induction of the new President (the Right Hon. Lord Weir of Eastwood). In the evening there is to be the annual dinner.

GLOVER-WEST VERTICAL RETORTS AT PERTH.

The inauguration of the installation of Glover-West vertical retorts at the gas-works of the Royal Burgh of Perth was a pleasant and interesting function, which attracted a distinguished company on Thursday morning last.

Assembling at the City Chambers, 120 guests were driven in Corporation motor-buses to the works at Friarton, which are situated in sylvan scenery on the right bank of the Tay, which is there divided by a long island appropriated by the James VI. Golf Club. Beyond is a series of wooded precipitous hills of a very picturesque formation, extending for several miles towards the mouth of the river, which is here tidal and navigable for vessels of several hundred tons.

In the year 1900, the Friarton works were built on well designed lines of substantial and highly finished character. The retort-house contained fourteen settings of horizontal retorts 22 in. by 16 in. by 20 ft. long, operated by manual machines made by West's Gas Improvement Company, Ltd, which firm also built the settings and supplied the coal machinery. A few years later, De Brouwer stoking machinery was installed. Latterly this plant, which made 1¼ million c.ft. per day, scarcely supplied sufficient gas to meet the demand; and the conditions obtaining during the war accentuated its apparent inadequacy.

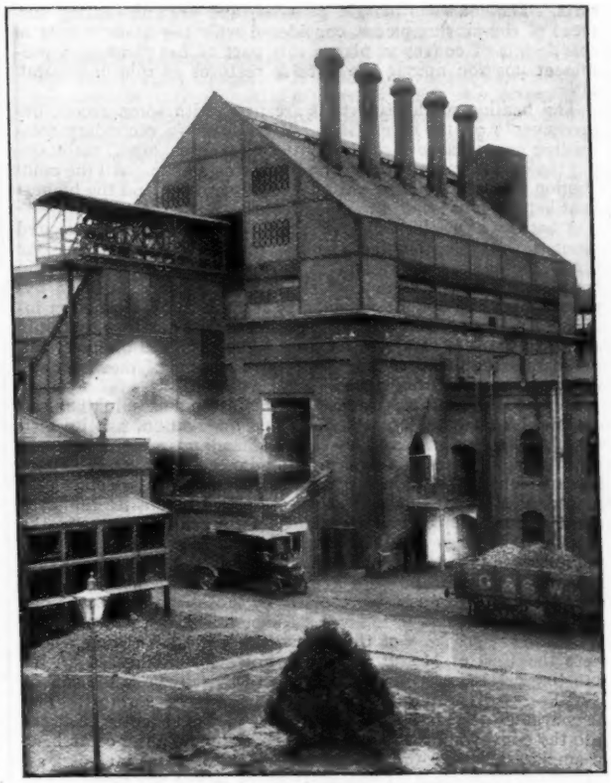
Exhaustive inquiries and long consideration occupied the energies of the Gas Committee under the presidency of Bailie Thomas Hunter, J.P., who has throughout been indefatigable in endeavouring, with the aid of the Gas Engineer (Mr. David Vass), to secure what he believed to be the system of carbonization best suited to the needs of the city, and which could be constructed in the most economical manner, without interfering unduly with the existing plant. Upon the report of the Engineer, supported by Mr. W. Doig Gibb, M.Inst.C.E., who was consulted thereon, the Council ordered this installation of Glover-West retorts.

The plant consists of five settings of eight retorts each, in units of four; but one of the settings is merely a shell, which will be provided with retorts and fittings when increased output is necessary. The daily capacity will then be nominally 1⅔ million c.ft. of gas of 500 B.Th.U. calorific value.

The removal of only three horizontal settings, and a chimney at one end of the retort-house, availed for the construction transversely of the five settings of verticals, which will produce considerably more gas than all the whole fourteen horizontal settings. Mr. Alan Clark, who is Engineering Assistant to Mr. Vass, recently read a paper before the Eastern District of the Scottish Junior Association (see "Journal" for March 21, p. 764) descriptive of the preparations made in clearing the site to facilitate the erection of the verticals and their connection to the subsidiary plant.

The longitudinal sectional drawing indicates how the installation has been disposed between the high-level railway upon which coal is received and the low-level line by which coke is removed. Truck tippers, actuated hydraulically, discharge the coal into a 20-ton coal hopper, from which it is drawn automatically into the breaker, or (if in the form of nuts) by-passed into the lip-bucket conveyor.

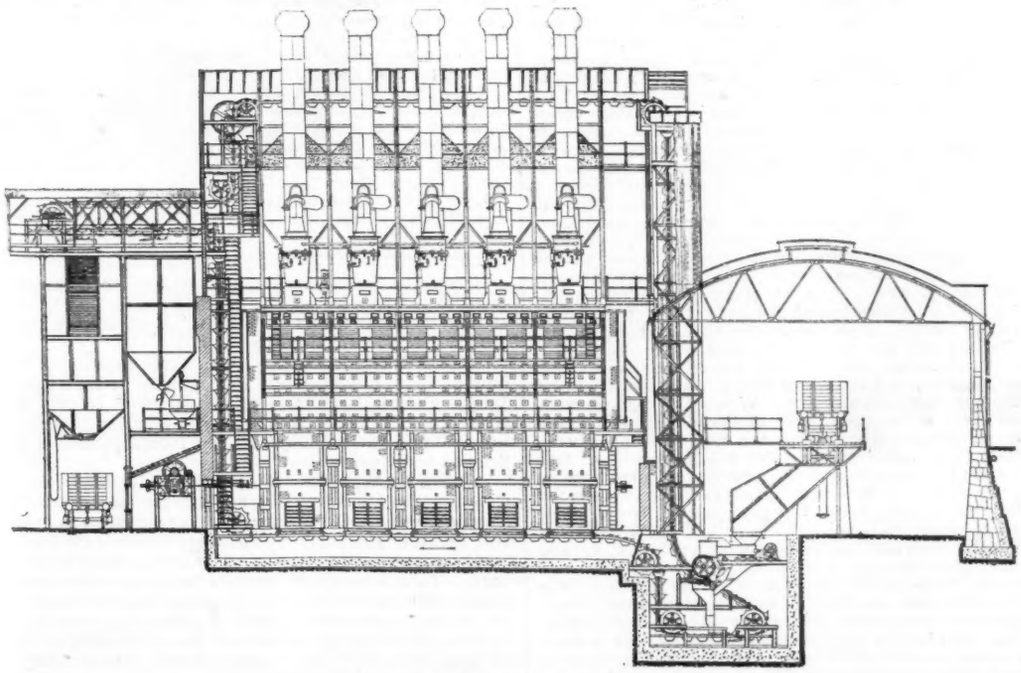
This conveyor is of 50 tons per hour capacity. It is of new design, and was entirely manufactured by West's Gas Improvement Company, Ltd., at their works in Manchester, together with all the other machinery and structure. While carrying silently and carefully both coal and coke, it obviates the necessity of interposing the rotary radial filler, to which there are some well-known objections.



Installation of Glover-West Vertical Retorts at Perth.

The coal storage above the retorts will supply them for a period of 48 hours; while the hoppers over the low-level railway can contain 50 tons of coke, delivered from the retorts by the lip bucket conveyor, which also fills the producer and retort feed hoppers. Each bucket of the conveyor is made out of only one plate of suitably cut form, from which it is shaped cold, without any diminution in thickness at any point. Indeed, the bucket is stronger at the points which are usually weakest in pressed buckets, by an overlapping of the plate.

The large capacity of the conveyor for the size of the installation permits all the coal required for one day to be elevated in less than three hours, so that its elevation is interrupted only once daily by the discharge and conveyance of coke from the re-



LONGITUDINAL ELEVATION OF GLOVER-WEST INSTALLATION.

torts. The generous margin of safety and area of wearing surfaces of the moving pieces, considered with the other merits of this design of conveyor, places this part of the plant in a prominent position among the notable features of this fine installation.

The heating of the retorts is arranged with some recent improvements on the older Glover-West form—a secondary combustion occurring towards the outlet of each chamber, maintaining the same temperature around all retorts alike. All the combustion chambers can be varied in temperature, and the highest heat kept at any level in the length of the vertical retort.

A battery of waste-heat boilers, shown in the drawing, created much favourable comment among the visitors. There is one boiler for each setting, carried by a strong steel structure, in front of the usual chimney, which can be switched on as a by-pass, should the boiler connected to it have to be cleaned or inspected. During such period the other boilers continue to supply steam to the retorts. The natural draught of the chimney can be readily regulated, avoiding the introduction of mechanically induced draught through the boiler.

Special facilities are arranged for the internal examination and cleaning of each boiler, which, in this installation, has its own automatic water feed, and low-water alarm apparatus of entirely new and simple design, rendering attendance unnecessary. There is a spacious platform in front of the boilers, which are efficiently lagged, and have a smart appearance. Feed pumps in duplicate stand opposite to the boilers, taking their suction from the works storage tank shown in the photographic view. The water is pumped into the tank from the river. The cleanliness, lightsomeness, and ventilation of the new vertical retort-house were frequently remarked upon, particularly by those who know the conditions which existed in the now derelict horizontal house.

During the progress of their tour, the visitors—among whom were the Earl of Moray and Lord Forteviot—witnessed an interesting ceremony when Lord Provost Dewar (who is the son of Earl Forteviot) and Bailie Hunter each charged a retort. The discharging of the coke from the retorts in rapid succession direct into the conveyor by one man, and the complete absence of heat or smoke, delighted the spectators. The company included an important proportion of ladies, three of whom are members of the City Council; and there was ample evidence of intelligent appreciation of the process and the operation of the machinery, explained by a number of experts, some of whom were recognized as being engineers who have installed Glover-West vertical retorts in their works.

After a brief inspection of the exhauster and meter house and chemical laboratory, the guests were photographed, and then drove to the Station Hotel for lunch.

Speeches at the Lunch.

Lord Provost the Hon. John Dewar, M.C., who presided, having submitted the Loyal Toast,

The Right Hon. the Earl of Moray proposed "The City of Perth," and said he could imagine nothing finer as an ideal for a man born and bred in Perth than being returned as a councillor of that city.

Lord Provost Dewar, in response, remarked that, to him, the outstanding feature of the installation they had that morning inspected was its simplicity. Under the instruction of Mr. West, it seemed to him that he had only to pull down one lever and raise another, to supply Perth with gas for twenty-four hours. He congratulated Bailie Hunter on the work which he had done and on its successful termination.

Bailie Hunter next submitted the toast of "The Contractors"—West's Gas Improvement Company, Ltd. He said that, deciding that a bold policy was best suited to the needs of the gas undertaking, following the serious depreciation which the works suffered in consequence of the war, when it was impossible to maintain them in a proper state of repair, the Gas Committee asked for a report from Mr. Vass on the state of the works, and what was required to bring them up-to-date. Mr. Vass gave them a very exhaustive report, in the course of which he recommended the installation of vertical retorts. The Gas Committee prudently resolved to get independent advice, and sought counsel of Mr. W. Doig Gibb, one of the foremost consulting engineers in the gas industry. Mr. Gibb advised them to proceed without delay to instal vertical retorts in preference to renovating the existing house and system. Alderman West would be gratified to know that the result of subsequent inspections made of different types of vertical retorts, seen in actual operation, was that the deputation were unanimous in the view that they had seen nothing to beat the Glover-West installations. This led the Committee to invite plans and offers for the work; and, again to the gratification of the Committee, the Glover-West was, in their opinion, not only best suited to the needs of Pertb, but also the cheapest. The contract was ultimately placed with West's Gas Improvement Company; and the acceptance of their offer might be taken as a tribute to the satisfaction which West's Gas Improvement Company had given to the Corporation of Perth. It was West's Gas Improvement Company who designed and fitted the settings in the gas-works when they were erected at Friarton in 1900. At that time, West's hand charging and discharging plant was looked upon as the last word in gas making; and Perth had never reason to regret the work done for them by that firm. The gas industry, like all other industries, had not stood still, nor had the firm of which Alderman West was the head. This firm had not been content to follow, but had led the way, until now their system of carbonization had attained to a state of perfection which was the admiration of the gas industry. The Glover-West verticals were not of the nature of an experiment. They had been in operation and proved a success in all parts of the world. Before the war West's Gas Improvement Company had erected Glover-West retorts in thirteen different countries. At the present time they were building installations in Copenhagen, France, America, Australia, New Zealand, Ireland (including Dublin and Belfast), and Scotland, where there were now fifteen Glover-West installations. Before the work of erecting the new plant at Perth could be begun, the clearing of the ground and the rearrangement of the old system, in order to maintain a continuous supply of gas, required the exercise of much engineering ingenuity and skill; and credit for the successful way in which this delicate task was achieved belonged to Mr. Vass and his staff at the works. That day they had the opportunity of seeing the completed work; and he ventured to say that everyone would agree that it was good. They might also congratulate themselves and Alderman West and his firm that the contractors had kept well within their contract price. The original contract amounted in round figures to £59,600. As a result of the falling markets, and the adoption of a sliding-scale, the Town Council stood to save a sum of about £4500 on this contract. When the work was in progress, the system of waste-heat boilers, the acquisition of an electric lift, and some minor additions to the installation were adopted, at a cost of nearly £5000 additional. Yet, despite these extras, the whole contract would, so far as had been ascertained, be under £61,000—£4000 less than they had anticipated. He saw no reason why the consumers should not begin to enjoy the fruits of the new installation a year hence in the form of cheaper gas. They congratulated the contractors and Mr. A. C. Hovey, their principal representative (one of the most conscientious gentlemen it had ever been their privilege to meet), on the conclusion of what they felt assured was a first-class job. He coupled the toast with Alderman West, whose success as Chairman of West's Gas Improvement Company was no doubt in a large measure due to the knowledge and experience he had gained as one of the oldest and most highly-respected members of the Corporation of the great industrial city of Manchester, of which some day they hoped to see him Lord Mayor.

Alderman Fred J. West, C.B.E., acknowledging the toast, said he should like at the outset to thank Bailie Hunter for the very nice language in which he had proposed it. His presence there that day was in the nature of an interesting visit to Perth. He could not take very great credit for the admirable success of the day's meeting; and in this respect he had to say that the excellence of the work which had just been completed was due, in no small measure, to their Scottish Manager (Mr. Hovey) and their staff, who had carried out the contract with the capable assistance of the Manager and staff of the Perth Gas Department. The Gas Committee and their Convener were deserving of all praise for their enterprise in remodelling the Perth Gas-Works. He trusted the city and its ratepayers would express their gratitude for admirable services rendered. As an old campaigner in municipal service, he should be prepared to say that, while occasionally one did get thanks, as a rule there were more kicks than expressions of gratitude; but in his experience there was no service given more gratuitously and voluntarily than that of representatives on their municipalities. It had been his privilege to travel extensively in America, Canada, and on the Continent; and he had made no small study of public service in the various countries he had visited. As a consequence, he had come to see that no country was better served in this respect than Great Britain; and nowhere was that service given more voluntarily and with less desire for thanks. They had inspected that day the installation in place of the old plant which his firm had had the privilege of installing some 25 years ago. Its features were its simplicity, its cleanliness, and the small number of working parts which had to be controlled. If they expected no extra initiative or responsibility, however, they would be greatly disappointed, because they had just installed a plant that required even more intelligence, and increased responsibility, on account of its refinement and the wonderful results that could be produced, than the old method of carbonizing. In the work of the Engineer and his staff, his firm would give, as they had given in the past, all the assistance they could. He wished the Gas Committee of Perth, and the Convener and Manager, every success in their new enterprise. As contractors, they desired to take the opportunity of earmarking the day's proceedings by making a small presentation; and on behalf of the firm, he asked Bailie Hunter's acceptance of a silver salver, with the wish that he might be long spared to preside over the deliberations of the Perth Gas Committee.

[The salver, which was of solid silver, had on it an engraving of a vertical retort in operation, and an inscription.]

Bailie Hunter said it was exceedingly difficult to find words to express his surprise and thanks for the gift. He had been sufficiently rewarded in the completion of the work that day. He had taken a keen interest in gas affairs, and had to thank the Gas Engineers of Scotland, who were good enough to select him as one of the twelve of their Executive Council.

Lord Forteviot submitted "The Gas Convener," which was acknowledged by Bailie Hunter. "The Chairman" was proposed by Sheriff Boswell.

Southern Association of Gas Engineers and Managers (Eastern District).—The next meeting of the Eastern District of the Association will take place to-morrow (April 26), at the Old Ship Hotel, King's Road, Brighton, at 2.30.

James Forrest Lecture.—At an extra meeting of the Institution of Civil Engineers on Friday, May 4, at 6 p.m., the 29th James Forrest Lecture is to be delivered by Sir Richard T. Glazebrook, K.C.B., F.R.S. (honorary member of the Institution), who will take for his subject "The Interdependence of Abstract Science and Engineering."

Prizes for Appliance Sales per Meter.—Approval has been intimated by the Executive Board of a recommendation of the Commercial Section of the American Gas Association to award suitable prizes to gas company members showing the best results in appliance sales per meter during the twelve months ending August next. Returns made by companies for previous periods show widely differing results; and it is hoped by the Section that what the leading companies succeed in doing may prove an incentive to other undertakings, and assist in establishing some standard of appliance sales per meter towards which every company member of the Association will strive.

"NEW WORLD" COOKER.

Details and Principles.

Though cooking apparatus is pre-eminently important to women, and women are supposed to be specially interested in fashions, there is nothing in which fashions are less admissible than gas-cookers—the cost involved is far too great. Great sums of money, amounting to many thousands of pounds, are invested in cookers and parts by gas undertakings, and in patterns and stock by gas-stove firms. Neither of these interests, therefore, can afford to consider the adoption of radically new types without the most substantial advantages being assured beyond possibility of disappointment.

A Renaissance in Gas-Cooker Design—

For a long time, nothing heroic was attempted in the way of progress in gas cooker design. Some dozen or more years ago, however, a movement became evident towards re-considering the traditional ideas underlying cooker design, as the outcome of the efforts of a few investigators in the industry who had devoted many previous years to research and experiment in this direction. The concentration of much of their experience and of their laboratory resources on this line of investigation resulted in certain developments—important in themselves, but still more important for what they led up to.

—and Its Sequel.

The inventors of the "New World" cooker, which is now being placed on the market by Radiation Limited, have had a full sense of the value of those excellent new features which have signalized this renaissance of gas-cooker design—the more so that these new features have emanated almost wholly from experimenters and inventors who are now within the borders of Radiation. What is affirmed with regard to the "New World" cooker is embodied not inaptly in its somewhat challenging title. Radiation believe that the coming of this cooker marks what might be

The "New World" Cooker.

called the close of one dispensation and the opening of a new one. It is the turning of a corner, and the opening of a fresh vista towards another point of the compass. Hitherto, successive patterns have been claimed to be improvements upon previous cookers. The "New World" is not an improvement upon previous cookers; it is a new apparatus altogether. Its inventors assert that, being as much better as it is different, it justifies the claim that it ushers gas undertaking and consumer alike into a new world.

Gas Consumption in the "New World."

The first question to be asked will concern the degree of economy in gas consumption which the new construction effects, beyond what has been accomplished by the best of recent methods. On this, its inventors speak, not merely with confidence, but with enthusiasm. No one knowing what it costs to produce and sell gas to-day, as compared with the state of things before the war, will fail to recognize that, if the makers' averment that in the "New World" cooking can be done at a cost for gas no greater than in the pre-war period can be substantiated in continuous use, the new apparatus will have gone a long way to justify its makers' challenge and the claims by which they support it.

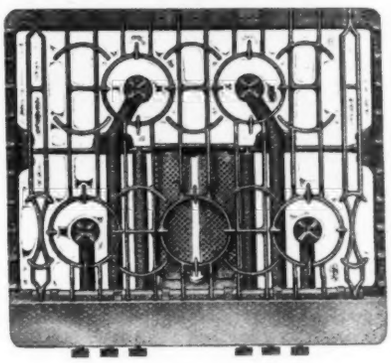
Simplifying Replacement of Parts.

Scarcely less important in the matter of economy is the cost of replacing parts. Upon this is brought to bear—as regards the hotplate—an ingenious unit system, by which the hotplate consists almost wholly of multiples of one part—these individual parts being placed alternately "end-for-end" to each other—and is built up of two distinct parts only.

There are only two patterns of long-shank burners, and one pattern of short, for all hotplates. The grill has only one pair of burners, and one pair of deflectors. The hotplate taps—duplex and simplex respectively—are the same throughout; and these taps are of a new "spigot" type, rendering the fixing of taps much more simple and effective than hitherto. There is one pattern of gas-rail only for all hotplates.

How Gas is Saved.

Dealing with the economy of gas, we come first to the hotplate burners. Here it has been decided by the inventors of the "New World" that the "High-Efficiency" type, for whose introduction Radiation firms are responsible, and which has already vindicated and established itself, should be the burners used in the new apparatus; and for that purpose this type of burner has been perfected in many details. There is express avoidance of liability to choking of the burner orifices—as, for example, by liquids boiling over—and nothing has been neglected which experience could suggest for simplifying cooking operations.

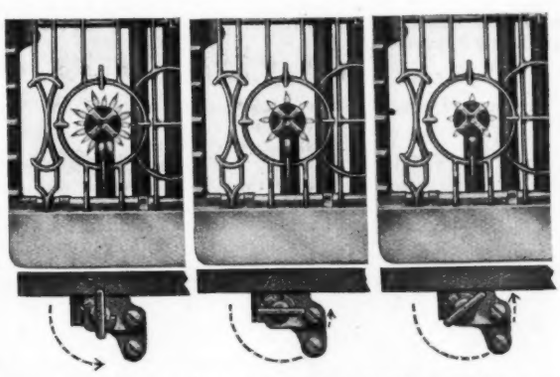


The Hotplate.

The same patterns of boiling burners are used throughout; while the duplex tap is an appliance of three operations, and is of a new and striking kind. Turned-on a quarter of a turn only, it gives the full amount of gas for maximum requirements; a second quarter-turn reduces the consumption to "simmering" position; yet another, and lesser, turn—still in the same direction—cuts-down the gas to the small amount so useful for many cooking operations requiring a continuous but mild heat, and with the comforting certainty that it is impossible to turn it too far down, so as to risk its going out. The gas can only be turned-off by turning it right back through the two previous quarter turns to the normal "off" position. The simplex tap has the "full-on" and "simmering" positions only.

The Hotplate Units.

The design of the hotplate units co-operates with that of the "High-Efficiency" burners in making for an extreme degree of economy in gas. The principle of allowing an adequate and



Section of Hotplate, in Plan, showing three Positions of Flames, with Section in Elevation, showing Taps in corresponding Positions.

suitably-shaped free space round the burner for the proper development of the flames has been combined in a happy manner with the unit system; and heat is not lost through its being conducted away by contact with the bars. But it is the placing of a vessel over a burner which tests the perfection of its design in

the matter of good combustion; and here evenness of flames and complete combustion continue with the vessel in position.

A novelty in the bars, as applied to "High-Efficiency" hot-plates, is that they have been designed so as to give facility in sliding vessels from one burner to another.

The Grill.

An exceptional degree of thoughtful care is evidenced in the design of the grill. It offers an unusually large grilling area; and its deflectors are so designed as to extract the utmost amount of heat from the flame.

The "New World" Oven.

Coming to the oven, we find the element of newness prominent in an altogether unusual degree. A patented feature of the oven is the way in which its flue outlet is placed at the bottom of the oven, instead of at the top. For this reason, the whole interior of the oven is good cooking space; bread placed on the bottom shelf baking to perfection. Experts in baking, both professionals and practised housewives, have declared the "New World" oven, after exhaustive personal tests, to be not only far better, but far different, as compared with any cooker they have previously used.

Interior of Oven, showing Oven-Shelf Supports.

There is said to be a superiority in flavour and in the appearance of browning in which the "New World" bread stands alone; and what is true of bread, is equally true of pastry, tea-cakes, puddings, pies, and joints.

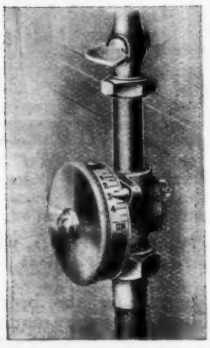
How Labour is Saved.

The new flue arrangement to which we have referred is said to ensure such uniform heating throughout the oven that there is no need to shift bread from one part of the oven to another during the process of baking. The saving of trouble in this respect is enhanced by the fact that the user has only one oven burner to control, not the usual two. Indeed, reduction of the labour hitherto required is an outstanding feature of the "New World."

Labour saving as regards cleaning is promoted by the wholly new manner in which the oven shelves are supported. Loose shelf-supports are dispensed with; embossed projections on the smooth enamelled linings being contrived to carry the shelves and grids. These, when drawn out for examining the food, are held firmly in position.

Dispensing with Watching and Worry.

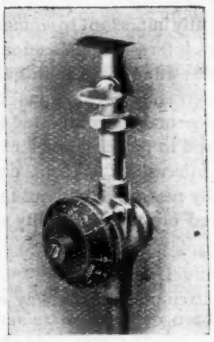
The best of cookers have hitherto required the food to be watched during cooking; but two striking new contrivances for obviating this necessity appear for the first time in connection with the "New World." One is the "Accurette" graduated dial tap, by which the user may set the gas consumption to the exact figure on the dial which she finds by experiment to be right for the particular work in hand, and has not to make a variation of the gas every time—based on the length of the flame. The "Accurette" dial tap has the further advantage that, when the gas is turned low, the hand cannot accidentally go too far and turn it out. The gas supply is turned on and off by a master tap with thumbpiece placed above the "Accurette."



The "Accurette" Dial Tap.

Automatic Control in Gas Cooking.

A further, and great, stride forward has resulted in achieving something very close to finality in respect of automatic working and the elimination of personal attention in the "Regulo" automatic heat-controller. Where this contrivance, with its graduated disc, is attached in place of the "Accurette," and the pointer is set against the particular mark required, the necessary temperature is automatically maintained, and the cook only needs to know for what period the particular food requires cooking. During this period, her attention can be given to other occupations, and on its expiry the food will be exactly ready.



The "Regulo" Automatic Oven Heat-Controller.

With this automatic temperature control, the oven cannot get too hot, neither can the cooking miscarry through any fall in temperature. With the "Regulo" is being issued a list of settings necessary for a full range of the various classes of food.

The "New World" Literature.

Great pains have been taken, in the booklet prepared by Radiation for launching this new cooker, to illustrate clearly and precisely the nature of the three types of flame produced by the three positions of the tap in the duplex form of the "High-Efficiency" burners. This has been done by a combination of half-tone and colour work which we think is about the best reproduction of correctly-burning bunsen flames, with their green cone and purple outer body, that we remember to have seen.

The booklet has a very striking picture on the front cover, in which a young housewife, on the tiptoe of delighted anticipation, welcomes the arrival of the "New World" as a fresh planet swimming into her ken; and it may well be believed that the reception of the "New World" cooker in the industry and in consumers' households will be equally cordial.

Resuscitation from Gas Poisoning.

In the April issue of the "American Gas Association Monthly" appears a second report of a Commission on Resuscitation from Poisoning by Manufactured Gas," drawn up by Dr. C. K. Drinker and Dr. W. B. Cannon. It is divided into two sections—the first discussing present practice, and the second the eventual course of patients so poisoned. This report has been prepared by the authors prior to making an actual examination of artificial respiration. The experience of the Detroit City Gas Company indicates that in most cases of gas poisoning the patients are breathing when first seen, and that a large percentage are unconscious; and these facts indicate the utility of oxygen carbon dioxide inhalations as recommended in a previous report of the Commission. The evidence obtained leads to the conclusion that it apparatus is to be employed to supplement the manual prone pressure method of artificial respiration, it should be in the form of some device to provide inhalation of oxygen and carbon dioxide. Inhalation of oxygen alone has rather wide employment among the gas companies, and can be commended. Evidence gathered from hospital records indicates that in gas poisoning any method of artificial respiration which drives air by positive pressure into the lungs may be a source of danger to the patients treated. The final recommendations of the Commission will be offered at a later date.

Consumption through Prepayment and Ordinary Meters.

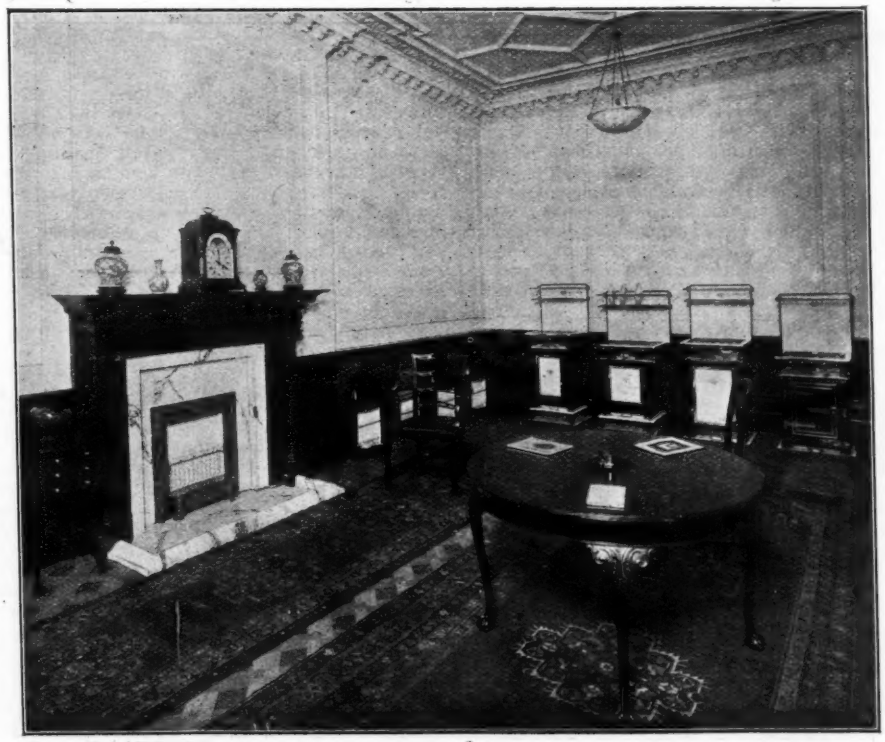
Discussion of the question of the comparative consumption of gas through prepayment and ordinary meters has led to the recalling of an investigation he made some twelve years ago by Mr. Henry S. Whipple, Manager of the Rockford (Ill.) Gas Light and Coke Company. Writing to the "Gas-Age Record," Mr. Whipple says that the first step in the investigation was to go through the ledgers and find the accounts of customers who had changed over from ordinary to prepayment meters, and had then gone back to the ordinary system. Analyzing these accounts, and taking the consumption for the same months of different years, with conditions remaining just the same, in those houses, it transpired that, when the ordinary meters were changed to prepayment ones, the consumption at these houses dropped on an average 486 c.ft. per month per meter. When changed back to ordinary meters, the consumption increased 491 c.ft. per month per meter. At that time, also, Mr. Whipple found that the cost of reading prepayment meters was over 1 cent. per month more than the cost of reading an ordinary meter. Another interesting point is brought out by Mr. Whipple. While making the investigation in question, he selected a few houses occupied by wealthy people who used electricity for light, and found the average consumption of gas for those houses to be 7570 c.ft. per month. The same number of houses occupied by well-to-do people, and using electric light, consumed 2559 c.ft. per month per house; and a similar number of houses not wired, and occupied by labouring people, consumed 1258 c.ft. per month per house.

MESSRS. R. & A. MAIN'S NEW SHOWROOMS.

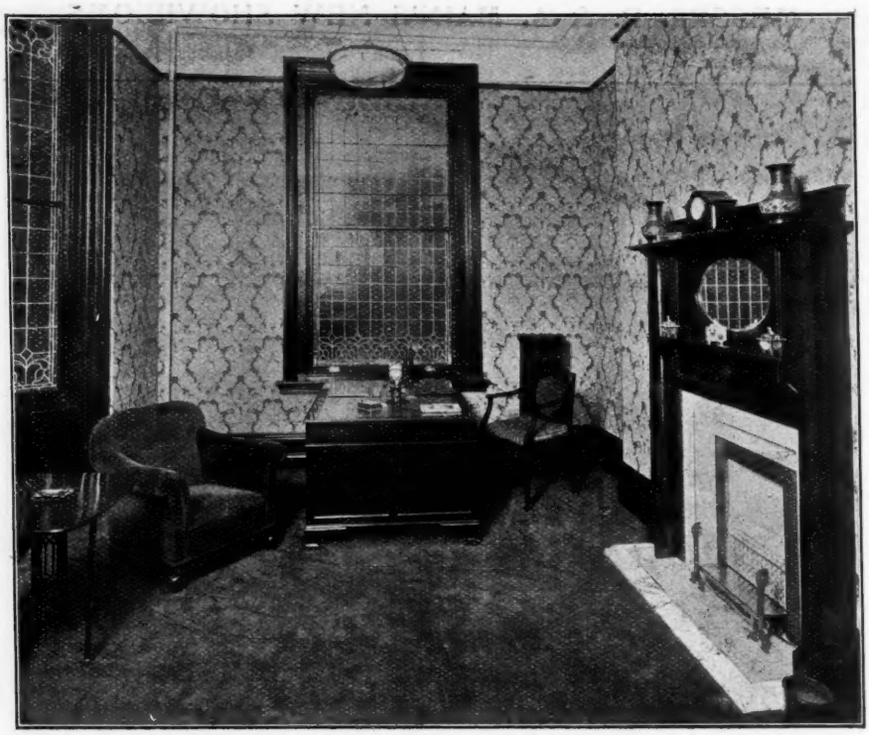
A VIEW OF THE SHOWROOM.

Grosvenor Gardens, Westminster, lying within the shadow of Victoria Station, and close to Buckingham Palace and the two Royal Parks, is a centre of attraction to the gas engineer paying a visit to London. At one time an aristocratic residential area, it has now become almost entirely a commercial centre in which the gas industry is particularly well represented. Owing to the various national bodies connected with the industry having established their headquarters either here or in the vicinity, a steady flow of immigrants allied to the gas industry has taken place during recent years. The result is that Grosvenor Gardens bids fair to become to the gas industry what Lombard Street is to banking or Leadenhall Street to shipping.

The new showrooms recently opened by Messrs. R. & A. Main, Ltd., at No. 38, Grosvenor Gardens, are thus ideally placed for gas engineers visiting town. These showrooms, which stand on the west side of the Gardens, consist of a suite of three rooms on the ground floor, and comprise a showroom, a board room, and a reception room. The first room, which is the showroom proper, is a light, airy room of good proportions, with an ornamented ceiling and deeply recessed windows framed in carved mahogany. On entering this room, one notices immediately the handsome fireplace. This fireplace is built of Pavanazzo marble, the curb being of the same material, and the surround of carved mahogany. The armour bright 18-in. "Byron" gas-fire interior fitted in the fire-



ANOTHER VIEW OF THE SHOWROOM.



PART OF THE RECEPTION ROOM, SHOWING FIREPLACE.

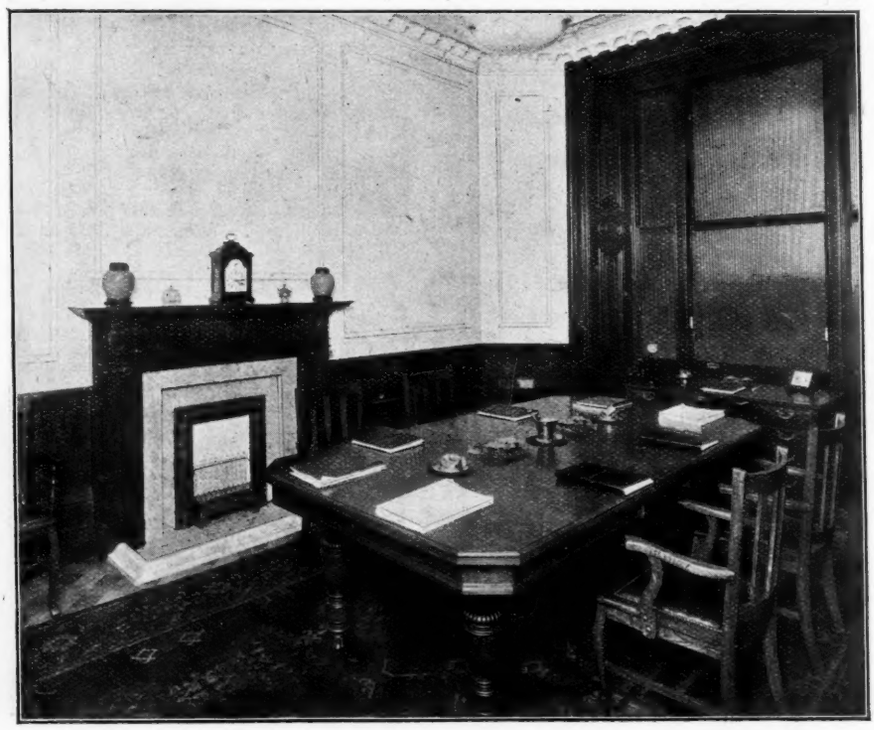
place harmonizes perfectly with its imposing setting, the whole presenting a convincing example of the artistic possibilities of gas heating appliances.

The examples of gas cooking and heating apparatus to be seen in this room have been chosen with the object of displaying all the latest and best types manufactured by Messrs. Main. The gas fires are principally examples of the well-known "Author" series, and are presented in a variety of finishes—armour bright, bright black, porcelain black, rubber black, electro bronze, and fine cast or blacklead finish.

A notable exhibit, and one that is certain to attract much attention during the next few months, is the "Gala" gas interior and mantel register. This stove has been specially designed for bedrooms, and is eminently suitable for housing schemes. The mantel is of cast iron, and can be painted to harmonize with any decorations. The one here shown is painted to represent mahogany. In addition to these fires, we have examples of the "Entente" inset fire and of gas-steam radiators.

It is worthy of note that all gas fires are shown against a background of old gold. This scheme of setting is one well calculated to show these goods to the best advantage. It harmonizes with every kind of finish, and is distinctly pleasing to the eye. The fires stand close-up to their background, special provision having been made to accommodate the flue nozzles. An interesting display of grillers, range plates, baking plates, gas rings, gas irons, and other small gas appliances will be noticed on the shelves. Several of these are of improved design, and will well repay inspection.

The gas cookers on view comprise the "Mainstay," the "Maintenance," and the No. 1222 on stands; and also the "Maintenance" with oven extended to the floor. These cookers are too well known to need any elaborate description here. Suffice it to



BOARD ROOM.

say that a more attractive array could not be imagined. Each cooker is fitted with the "Main" new pattern plate rack and back plate, which, being fixed direct to the bridges, leaves the hotplate clear, and permits of the white enamelled plate entirely hiding the supports. We may mention, in passing, that one of the "Maintenance" cookers is connected to the gas supply, and is in daily use. Visitors can therefore see this cooker in operation at any time they desire.

The Board room, which is admirably arranged for its purpose, provides another example of an attractive and well-appointed fireplace. The armour bright "Tennyson" gas-fire interior adorning the centre blends well with the Breche Rose marble surround, the whole being excellently set-off by the imposing mantel.

At the far end of the corridor is the reception room. Two sides of this room are taken up by leaded windows, which, while admitting ample light, serve to prevent any undue glare. The fireplace is singularly beautiful. It comprises a "Chaucer" interior fitted with an 18-in. "Entente" fire, a Swedish Green marble surround, and a dark mahogany mantel of striking appearance. This room, as befits one used for consultations and interviews, has been provided with every comfort for those who visit it.

The furnishing has been well carried out by Messrs. Hampton & Sons, of Pall Mall; and Messrs. Main are to be congratulated on the possession of such an effectively equipped suite of rooms as those situated at No. 38, Grosvenor Gardens.

THE DISTILLATION OF AMMONIACAL LIQUOR.

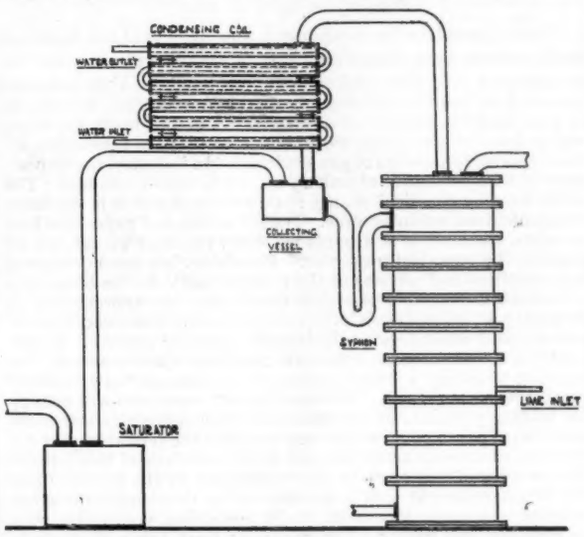
By W. Mason.

Ammoniacal liquor is generally subjected to distillation; the ammonia being converted into the more useful form of ammonium sulphate. During the last forty years many forms of apparatus have been devised for dealing with this liquor. The plant generally used in gas-works consists of a still composed of metal cylinders fitted with a number of perforated trays provided with overflow pipes leading into shallow wells. The upper part of the still is connected with a vessel charged with lime and in communication with the lower portion. The ammoniacal liquor is pumped into the top part of the still, and overflows from one tray to the other till it reaches the lime vessel, where it mixes with the lime, and then passes down the lower part of the still, finally running away through an exit pipe. Steam is injected through the still. In the upper portion of the still the volatile ammonia and ammoniacal compounds, and in the lower part of the still the fixed ammonia, are driven off. The vapours passing through the orifices and finally escaping from the top are then passed through a saturator containing sulphuric acid, where the ammonia sulphate is formed and deposited. The remaining gases and steam are then cooled and condensed, and finally pass through an oxide of iron purifier. This arrangement is far from perfect, for much ammonia is frequently lost, an offensive condensation containing sulphuretted hydrogen is produced, and many difficulties are experienced in the working of the oxide of iron purifier.

When a large percentage of the ammonia in the liquor is fixed, a great deal of it generally goes away in the effluent liquor and is lost—sometimes as much as 30 p.ct. is lost in this way. In the working of one of the above-mentioned plants, in which the liquor charged into the still contained 2·54 p.ct. of ammonia, this liquor, after passing through the first part of the still and the lime vessel, on entering the lower part of the still contained 0·589 p.ct. of ammonia, while the effluent liquor contained 0·068 p.ct., which shows a loss of 4 p.ct. In another apparatus in which the ammoniacal liquor contained free ammonia 1·04 p.ct., fixed ammonia 0·88 p.ct., total 1·92 p.ct., the effluent liquor contained free ammonia 0·066 p.ct., fixed ammonia 0·33 p.ct., total ammonia 0·396 p.ct., which shows a loss of about 31 p.ct. With increased lime feed and more careful steaming the effluent liquor contained free ammonia 0·046 p.ct., fixed ammonia 0·003 p.ct., total 0·049 p.ct.—a loss of 3·8 p.ct. This example—and many more might be quoted—clearly shows the liming arrangement in this apparatus is not efficient, and that an irregular flow of liquor into the still would cause the lime to become carbonated, and interfere with the efficient working of the still for some considerable time. It is well known that it is not economical to use milk of lime containing 50 p.ct. of its lime content as carbonate for this purpose. With an insufficient supply of lime and excessive steaming a large amount of condensed water containing sulphuretted hydrogen is produced by allowing this excess of steam to pass through the saturator. The condensed water often contains a considerable quantity of ammonia, which is lost. It can easily be seen that an irregularity in the working of this condenser would interfere very much with the effective working of the oxide purifiers, since it is essential that the gases entering these should be well cooled and free from moisture. Much of the trouble in this connection arises from this condenser.

A much more efficient arrangement might be made by placing a coil condenser between the still and the saturator, as shown in the accompanying diagram.

This arrangement is used in the ammonia-soda process for dehydrating the ammoniacal gas from the still. It is most efficient in operation. The gases issuing from the still at a temperature of 98° to 100° C. are cooled to 68° to 70° C., and the condensed liquor syphoned back into the still. By such an arrangement all the sulphuretted hydrogen would be passed through the purifier and recovered, instead of, as in the present arrangement, becoming a nuisance. It may also be mentioned that in the ammonia-soda process the still consists of one cylindrical tower divided into two parts, the upper part for recovering the free ammonia and the lower for recovering the fixed ammonia. There is no outside liming-vessel, the milk of lime being charged directly into the top section of the lower part of the still. Some of these



stills recover ammonia equal to 250 tons of sulphate of ammonia per day. They receive much care and attention. The ammoniacal liquor and milk of lime are placed in measured tanks, and a fixed quantity of each is charged into the still simultaneously by separate pumps every hour. The milk of lime, containing 2¾ lbs. of lime per gallon, is tested, and an amount in excess is used—such an excess that the effluent liquor from the still is run into settling tanks, and the settled lime portion returned to the still until its lime content contains 50 p.ct. of carbonate, when it is run to waste. No effluent liquor is allowed to run away containing more than 0·005 p.ct. of ammonia. The success of the ammonia-soda process largely depends upon the economical use of ammonia; and so carefully is this carried out that the ammonia lost is equal to less than one part of sulphate of ammonia per 100 parts of soda ash manufactured.

It is not correct to say that it does not pay to recover the fixed ammonia from ammoniacal liquors, or that the effluent liquors from the stills cannot be freed from ammonia—ammonia is many times more valuable than lime.

Sulphur Compounds and the Selection of Gas Coals.

Data collected by Mr. J. B. Craven, of the People's Gas Light Company, Chicago, have been included in a report by Mr. W. A. Dunkley, of the Bureau of Mines. They have had under consideration the question of sulphur compounds other than hydrogen sulphide in gas as a factor governing the selection of gas coals. Replies received to an inquiry did not provide much accurate information regarding the amount of sulphur compounds other than H_2S removed by the purifiers. Such figures as were forthcoming seemed, they say, to point to the fact that, in certain conditions, the oxide purifiers do remove some of the sulphur compounds other than H_2S, the amount removed probably depending upon the quantity of free sulphur present in the mass. Other conclusions drawn from the replies are that the total sulphur content of the purified gas is not now a limiting factor in the choice of coal. There is no well-defined relation between the sulphur content of the coal and either the H_2S content of the crude gas or the total sulphur content of the purified gas; neither is high H_2S always accompanied by high fixed sulphur. Another conclusion arrived at is that the degree of sulphiding of discarded oxides seldom reaches the 50 to 60 p.ct. so often given as a figure for best purifying performance, despite the fact that all the plants considered are large ones. In only three of ten plants included in a table is revivification *in-situ* practised; and the reporters say it is undoubtedly true that this method has its faults, which prevent operators from taking advantage to the utmost degree of its theoretical benefits. It is suggested that a further study would be useful of conditions which tend to make the sulphur in coal go over into fixed sulphur compounds. Likewise the conditions in purifiers which tend to the elimination of a part of the fixed sulphur in the purifiers should be better understood. However, from the data gathered, it seems that, with liquid or other purification methods which will permit the removal cheaply of additional amounts of H_2S from the gas, the fixed sulphur content of the finished gas will be no bar to the use of coals of considerably higher sulphur content, unless the higher sulphur coals should yield a proportionately larger amount of fixed sulphur to the gas.

THE FUNCTIONS AND DUTIES OF THE CHEMIST AND THE BEARING OF CHEMISTRY ON THE GAS INDUSTRY.

By G. H. Gemmell, F.I.C., Official Analyst of the North British Association of Gas Managers.

[An Address to the Scottish Junior Gas Association (Eastern District) on April 21, 1923.]

I fully appreciate the compliment you have paid me in asking me to address your Association. It is always a pleasure for me to meet and talk with juniors in any profession. Your presence here to-day, and the membership of this Association, is evidence of your desire to learn and discuss some of the many problems which arise in your daily work, and thus prepare yourselves for the responsible position of gas engineer. In industry, the importance of a knowledge of chemistry cannot be over-estimated. The world lives by chemical change; and chemical action is the foundation of all our manufactures. The ink we use and paper on which we write, the clothes and boots we wear, the food we eat, are all prepared by chemical processes. Physiology has been defined as the chemistry and physics of the living animal. In the biography of Andrew Carnegie, it is stated that it was his appreciation of chemistry which enabled him to obtain an early lead over his competitors, and which formed the basis of his great success. In this instance, it was research upon raw materials which counted. He found he could get a better product from a cheaper raw material than he was then using. The men of the future who will occupy the leading positions in our manufacturing industries are those who are prepared to give time and study to the technology of the subject and take an active interest in Associations of this nature. The award of a certificate in gas engineering by the Institution of Gas Engineers might well be conditional on the candidate having contributed a paper to one of the Associations connected with the industry, and having taken part in at least three discussions on other papers.

My subject for to-day—which is the functions and duties of the chemist and the bearing of chemistry on the gas industry—is a very wide one; and the most I can do will be to draw your attention to a few salient points, in order that you may thereby be induced to make yourselves more familiar with the subject, and to form an introduction to a general discussion. The chemist in industry may be divided into two types. First, the university trained man, who has spent three to five years in the study of the subject and the allied sciences, such as physics and mathematics. When he has taken his degree, he will probably have little or no knowledge of works practice; but if engaged as chemist with a gas company, his training should enable him in a short time to become familiar with all the manufacturing details. If of the right type of mind, and if he can adapt himself to the changed conditions, he will find in the works there is no position in the industry to which he may not rise. More generally, however, it is this type of chemist, with the highly scientifically trained mind, who conducts fundamental researches; the results of which introduce radical changes and advancement in the industry. These changes are frequently of slow and almost imperceptible growth; and only after very many failures is their importance realized. The discovery and rise of incandescent gas lighting is a familiar example.

The second type of works chemist is the lad who leaves school with a good general education and perhaps a smattering of science, and then becomes an employee of the local gas company. At evening classes he learns more of chemistry and physics; and he sees the practical applications in the works. He may have opportunities of carrying out simple tests in the laboratory. From this humble beginning, by perseverance and grit, he advances from one position to another, probably transfers to a larger works, and thereby gains more experience and has opportunity for attending more advanced classes. I presume that most of my audience belong to this class. The functions and duties of the chemist in the gas industry naturally fall into three categories.

1. To analyze and test raw materials and products in the laboratory—that is to say, his introduction to the industry is through the chemical laboratory.
2. Supervision and control of the manufacturing operations.
3. Investigation and discovery.

This is the general sequence. Suggestions for improvement and new discoveries of merit are more likely to come from those who have graduated in the works and works laboratory. In the past, the mistake has been that the chemist has given too much of his time to routine laboratory work, and too little of his time in the works. But I think I hear some of you say: "I do not wish to be a chemist pure and simple, but a gas engineer." By this term I understand the man who has full control of the gas undertaking, and is practically managing director. To me it appears that such a man must have three essential qualifications which can only be acquired by special training, natural aptitude, and experience. Of these I would first indicate general business training such as is usually acquired in the office. Under this head such matters as finance, book-keeping, statistical records, buying and selling, are included. "Oh!" you say, "I shall not have to do this work; the secretary will attend to all this." True, he will superintend and direct the office staff; but if the gas engineer is to be managing director, in fact as well as in title, he ought at any rate to be able to understand the secretary's duties sufficiently to be able to direct the policy of the company. Secondly, he must have the engineering qualifications. These may be acquired entirely by experience in a gas-works, or with a firm whose speciality is the making of gas-works plant, *plus* technical college training in such subjects as mechanical drawing, mechanics, machine construction and design, &c. I would emphasize this essential point. The gas engineer may have no experience of secretarial or office work, and only a superficial knowledge of chemistry or physics, and must delegate that part of the business to the specialists; but he must have the engineering and managerial experience. Thirdly, there is the chemical qualification required, to be gained at the university, the technical college, or the works laboratory, or a combination of them; and, as a chemist, I am disposed to believe that this is perhaps the most likely to lead to success, providing that you can adapt yourselves to the practical working details and erection of plant necessary in the industry.

The manufacture of gas is essentially a chemical industry; and its development and progress lie in the hand of the chemist. It is not possible in the time at my disposal to deal with the subject as fully as one could wish, but only to consider some of the salient points. The chemist has first to deal with the raw material, coal—its nature, and the changes that take place in the retort. In recent years much research has been made investigating the true nature and constitution of coal, and the character of the products obtained under varying conditions of temperature. It is surely a matter of supreme importance that the gas engineer should be familiar with the proved data of the different coals within his reach, so that he may select that variety most suitable for his requirements. He must also know the effect of steaming, the conditions which give rise to high CO_2 content, the effect of superheating the steam, and the nature and quantity of the gas and the bye-products. All these involve chemical and physical problems. He should understand not only how to take a record of high temperatures, but the principle on which the apparatus used is constructed. He should be able to draw-up a balance-sheet of profit and loss, however imperfect it might be at first, showing on the one side the thermal value of the coal used, and on the other how many of these therms he retains in the gas and what is lost by radiation and conduction. He should know something of the nature of refractories, and try to ascertain why some have a much longer life than others.

Though much has been written from time to time of the boiler-house and the treatment of feed water, this section is still a neglected and inefficient part of the gas works. I have been engaged for three years in making investigations on oxide of iron for gas purification, and have gained some information which should be of very material advantage. It may not be possible to obtain the same results in the gas-works as in laboratory tests; but these tests will indicate what kind of oxide it is most advantageous to use. The same applies to sulphuric acid, lime, and all other raw materials purchased. Every undertaking should keep a tabulated record of the composition of the gas made, as well as its calorific value, and sulphur, cyanogen, and naphthalene contents. As this record becomes known, any material change is at once detected and the cause looked for. The bye-products—tar, spent oxide, and sulphate of ammonia—are all sold; and the day is past when the gas engineer is prepared to accept the test of the value of these materials supplied by the buyer without a check in his own laboratory or by an independent analyst. The chemist in the gas-works, as in all other industries, must prove his value in terms of £ s. d.; and he should be able to apply the knowledge obtained by the tests I have indicated during his supervision in the works. His laboratory work should lead to greater efficiency in the control of the condensers, scrubbers, purification plant, and sulphate of ammonia house.

A Past-President of the Institution of Gas Engineers, I would remind you, said: "It is the duty of the gas engineer not only to put the gas into the holder, but also to sell it." Dr. Carpenter, I understand, did not agree with this; but at any rate all must agree that it is the duty of the gas engineer to know and recommend the appliances most suitable for the gas he is making. I can well believe that many of the complaints of which we hear of so-called bad gas are due to the use of imperfect appliances. A knowledge of the principles of combustion, and experiments with different makes of burners and cookers, would very quickly put into the hands of the engineer sufficient data to recommend those which were most economical and efficient. Many gas companies have already done this; but how often is the choice of burners, mantles, fires, and cookers left to the consumer and the local plumbers, with disappointing results, and the installation of electric lighting? I remember the generally expressed opinion of the man in the street that the gas industry was doomed by the progress of electric lighting; but during the past twenty years our industry has not stood still. It has made great strides in more efficient and economical production, and to-day the consumption is greater than it has ever been. You cannot, however, afford to rest on your oars; and the next twenty years may show as great an advance as the past twenty have done. What will develop in the future is hard to say. I am disposed to believe progress lies in the complete gasification of coal by the agency of oxygen and steam. With oxygen at 1s. per 1000 c.ft. made direct from the air at the works, this should be a practical proposition, resulting in increased output per ton of coal and cheaper gas. Cheaper gas is naturally followed by in-

creased consumption; and this reacts again by greater economy in production. Against this, we have the prejudice which still exists in many minds with regard to gas as a heating medium, supplemented in recent times by the press propaganda against carbon monoxide. A friend of mine, not connected in any way with the gas industry, and who uses nothing but gas in his house for lighting and heating, suggested that if the gas company would reduce the price of gas to 1s. to all consumers in one district of the city, for one year, and thus encourage and familiarize everyone with its advantages, they would never go back to the open fire and the coal-fired cooking range. Such a scheme is not at the present time a practical one, but it is valuable evidence from an uninterested party, to whom a little additional cost is not material.

Progress in the future will only be attained if the industry is in the hands of technically trained experts, whether engineers or chemists, and not, as is too often the case, in the hands of financiers and commercial men. There should not be antagonism nor jealousy between engineer and chemist, but co-operation. Prof. Armstrong, President of the Society of Chemical Industry, in a recent address, said "Engineering is the Handmaid of Chemistry." The engineer is the man who carries out in practice the ideas of the chemist. Take the example of the water supply, so essential to our communal life. The chemist must first determine the suitability of the supply; the engineer brings it in. The same applies to the sewage problem. Chemists have been working and devising methods of treatment to avoid nuisance, and if possible obtain from the waste some of the valuable ingredients, and thus reduce the cost of treatment. It is the engineer who carries it out. One, therefore, is supplementary to the other; and if success in any chemical industry depends on our progress in engineering, it is equally true to say that progress in engineering can only follow developments in chemistry. In another address, Prof. Armstrong stated that engineers have no curiosity—"the spirit of science is not in them. To their great loss they have not yet learned to utilize the chemists' services in the proper way. One of your tasks (he was addressing chemists) is to make known to them and to the public that no engineer should be allowed to work unaided and uncontrolled by the chemist."

Much has been written on the education of the gas engineer, but we are now at a stage when action is to be taken. You are probably all familiar with the schemes of the Board of Education, jointly with the Institution of Gas Engineers, for the future education and examination of those engaged in the technological work of the gas industry. I think it would be an advantage and a guide to those who are arranging this scheme if the various gas associations in the country had a discussion upon it, and thus let the views of those who are actually engaged and in close touch with the industry, be ventilated. The subject is one full of difficulties. Your President, in his address at the opening of this session, referred to it; and at the annual meeting of the Institution of Gas Engineers in May, 1919, there was a very important discussion. One of the questions difficult to decide was at what time or period scientific education should take place. Immediately after leaving school, or after some preliminary experience in the works? This question arises in other chemical industries and in engineering. If a boy first enters the works, he has definitely decided on the line of business he intends to follow. He obtains some knowledge of the problems he will have to work out; and this should give him an added interest in his scientific studies. The boy at school more often wants to go to a works rather than to college. Against this is the fact that in the works he may lose taste for study. The first years are wasted; and when, as a young man, he realizes the necessity for scientific study in order to make progress, he finds the capacity has passed away. He cannot learn as he did, and is often discouraged. The boy of 16 to 18, on leaving school and going direct to the technical college, has acquired the habit of study but is often at a loss to know what bearing the subjects he learns have in the industry.

Most of what I have said here to-day has been said before, and in a better way, but I have tried to attract your attention to the absolute necessity for the study of science if you are to attain a decent position in your profession. One will go about it one way, another in a different way, according to circumstances; but it is only by diligence and self-sacrifice that the object will be attained. I am a strong advocate of advanced scientific training and research, but a strong believer in self-education. Investigators and inventors are born, not made.

I made the acquaintance some years ago of a gentleman who had been general manager of a railway and dock company, and who had retired on a pension of £1500 a year. He was born in Midlothian, and rose from a very humble position in the service through all the grades. When asked the secret of his success, his reply was: "I always made it a point to be able to do the job of the man above me." If you don't remember anything else I have said to-day, I hope you will carry this away with you. The job of the man above you, or a similar one, will one day be vacant. Can you take it on?

North of England Gas Managers' Association.—The annual general meeting of the Association will be held in the Gas Office, Grainger Street, Newcastle-on-Tyne, on Friday of next week, May 4, at 2 o'clock, under the Presidency of Mr. J. E. Blundell. Two papers are to be submitted—one on "Calorific Value," by Dr. W. B. Davidson, of Newcastle-on-Tyne; and the other "Notes on Corrosion and other Deposits in Gas Services," by Mr. B. Richardson, of North Shields.

THE FIXATION OF NITROGEN.

The second of his series of Cantor Lectures on "The Fixation of Nitrogen" was delivered by Mr. E. KILBURN SCOTT, Assoc. M.Inst.C.E., M.Inst.E.E., before the Royal Society of Arts on Monday evening of last week.

The opinion was expressed by him that we ought to have in this country a centre like Niagara—preferably in Scotland, though not necessarily so. It has been said, too, that we cannot generate electricity cheaply from coal—that it is commercially not possible to fix nitrogen from the air by means of power derived from coal. But the Germans do it with brown coal of very low calorific value. The cost of making nitric acid in this country is governed by the cost of the Chili nitrate from which it is produced. Assuming the price of the nitrate to be £13 per ton, then a ton of 65 p.ct. nitric acid can be made for £20. By the arc process, and with a yield of 540 kilos. per KW.-year (62 grammes per KW.-hour), a ton of 65 p.ct. nitric acid can be made for £20 with electric energy at £10 per KW.-year. In the final report of the Nitrogen Products Committee it was stated that before the war electrical energy from a steam power station could be delivered in England at £3 15s. per KW.-year. There are water powers in Scotland and various parts of the Empire where electricity could be produced for this figure, and super-stations should be able to do it easily during off-peak hours. The arc process plant at Pierrefitte, in the Pyrenees, for making nitrates from the air, is the latest to be built on the Norwegian lines. It is designed to produce about 4000 metric tons of nitric acid (100 p.ct.) per annum, or, in other words, 11 tons a day.

In an arc process plant, the percentage of capital cost of the acid and alkali absorption towers is nearly half the total cost; and the aim is to cut down this heavy capital outlay. If the percentage of nitric acid can be doubled, or brought up to 2½ p.ct., the towers are cut-down to one-fourth the size as compared with towers required for 1½ p.ct. concentration; or if the towers are made of metal to withstand three atmospheres pressure, they can be cut-down very much below what is required when working at atmospheric pressure.

There are, he said, various methods by which the arc process can be improved. One is to add oxygen, and to pass through the plant equal quantities of oxygen and nitrogen. The cost of this oxygen should not prove excessive, as it is a bye-product of a number of processes. Indeed, the lecturer feels certain that there is going to be available in the future very much cheaper oxygen than is procurable to-day. With an oxygen supply on a favourable basis, the yield of the arc process would immediately be improved by 20 p.ct. Another suggestion for improvement was to use pressure. They should work all these processes together, so as to avoid overlapping.

Reference was made to the Hausser bomb process, in connection with which the results have been steadily improved as the size of the bombs has been increased. With the bomb now proposed, a concentration is anticipated of 1½ p.ct. with a plant designed to turn out 17½ tons of nitric acid (100 p.ct.) per twenty-four hours. The inventor has discovered that, by using three atmospheres pressure in the absorption towers, and by employing some acid-resisting steel instead of granite, he can reduce the tower space enormously, thus largely curtailing a very expensive item.

The plant built during the war by the American Cyanamide Company at Niagara Falls, which is capable of producing 40,000 tons of fixed nitrogen yearly, has been standing ever since it was tested; but several offers have now been made for it. The cyanamide process turns out calcium cyanamide, which is a fertilizer; and the calcium cyanamide can also be treated to obtain ammonia. In this country something similar should be done to what they are doing in America. There the big plant at Muscle Shoals, in the event of another war, could be very quickly utilized to make ammonium nitrate.

Gas for Galvanizing and Electro-Plating.—An issue of the British Commercial Gas Association's "A Thousand-and-One Uses for Gas" is devoted to the usefulness of the gas-industry in connection with the work of galvanizing and electro-plating. Like all these publications, it is well illustrated and written in an attractive and informative style.

Canadian Gas Association Convention.—It has been decided to hold the annual convention of the Canadian Gas Association this year in Ottawa, on Aug. 23 and 24. Ottawa has invariably proved a very good convention city. First-class accommodation is to be had at the Chateau Laurier; and gas men in the past have always had a splendid time in the Capital.

The Ceramic Society and Refractory Materials.—The Refractory Materials Section of the Ceramic Society are holding a meeting in the Town Hall, Bournemouth, on Thursday and Friday, May 3 and 4. The papers on the first day's *agenda* include one by Mr. G. M. Gill on "The Use of Refractory Materials in Gas-Works," and another on "The Behaviour of Clays, Bauxites, &c., on Heating," by Prof. J. W. Cobb, B.Sc., F.I.C., and Mr. H. S. Houldsworth. In connection with the meeting, a dinner and a number of visits are being arranged. The proceedings promise to be of considerable interest.

RESEARCH SUB-COMMITTEE OF THE GAS INVESTIGATION COMMITTEE OF THE INSTITUTION OF GAS ENGINEERS.

The "Fairweather" Recording Calorimeter.

EIGHTH REPORT.

(*Continued from p.* 163.)

COMPARISON WITH THE JUNKER CALORIMETER.

Gas of the same quality (about 500 B.Th.U. Gross per c.ft.) was supplied simultaneously to the "Fairweather" Recorder and the Junker Calorimeter used in the comparisons reported previously (Fifth Report, p. 186), and a series of determinations was made using the instruments alternately.

Actual tests and not chart values were taken from the "Fairweather" instrument, and both calorimeters were working under excellent conditions of use. Immediately after the close of the tests the escapement meter of the "Fairweather" Recorder was checked against the meter used for the Junker Calorimeter.

Certificated thermometers were used for measuring the temperature rises, and the same water vessel was used for the water. All results were reduced to 60° F. and 30-in. barometer, any appropriate corrections being applied to the results from each calorimeter. The direct determinations showed the C.V. of the gas as determined by the "Fairweather" Calorimeter to be about 9 B.Th.U. higher than that from the Junker Calorimeter. Upon correcting for the known error of the "Fairweather" meter, there was only 1 B.Th.U. difference in favour of the Junker Calorimeter—so that the results could be considered identical within the limits of experimental error.

Observations of the condensed water from both calorimeters showed about the same amount per c.ft. of gas burned.

Similar comparisons with an independent Boys Calorimeter have not yet been completed.

There is reason to believe that where the temperature of the water supplied to the recorder is steady, but somewhat different from room temperature, the "Fairweather" Calorimeter itself—as distinct from the chart—will yield results slightly in error. The extent of the error under different conditions is still under investigation.

THE RECORDER CHART.

The chart used with the "Fairweather" Recorder is 4 ins. wide, and equally divided so that 1/10 in. represents 5 B.Th.U.s.

There is a centre red line to the chart which can be given *any* arbitrary value to agree with the normal or declared value of any particular undertaking. The subdivisions of the chart then represent B.Th.U.s in excess or short of the declared calorific value. A range of ± 100 B.Th.U.s is provided which should be ample.

The original time-spacing of the chart was $\frac{7}{8}$ in. per hour, and as this was very convenient for our investigations it was retained. By changing a gear wheel in the drive, recorders for use under the Gas Regulation Act, 1920, are being provided with charts which travel at the rate of $\frac{1}{4}$ in. per hour.

Each chart covers a period of exactly seven days, and this might with advantage be extended for several hours at both ends. Even if it were possible always to be present at 9.30 a.m. to change the chart, it is necessary to feed some chart beyond the recording pen to engage with the driving pinion at the beginning of a chart and to leave sufficient on the rollers at the end, to ensure proper guiding and alignment of the chart. The few extra hours at both ends would allow for this and also give some slight latitude as to the time for changing the chart, without sacrificing part of the record. Some few of the batch of charts supplied commence at 9.30 p.m. instead of 9.30 a.m. with the remainder. It will be seen that with a time ruling of $\frac{7}{8}$ in. per hour, a weekly chart is 147 ins., or over 12 ft. in length. As the distance from the chart roller to the bottom of the recorder case is only 14 ins., the used chart collects into loops which may either interfere with the free passage of chart through the guides, or stop the swinging of the clock pendulum. The use of the shorter chart or a slot in the base of the recorder cupboard should remove this difficulty.

The chart rolls now supplied are wound as hollow cylinders $1\frac{1}{2}$ ins. in internal diameter, and we find these to be too loose upon the back chart roller which is only $1\frac{1}{4}$ ins. diameter, preventing a uniform feed.

The charts supplied are slightly too wide for the front guide roller. This has been noticed by the makers and the flanges have been cut away somewhat. The charts now have a tendency to mount the flanges of the front guide roller and feed irregularly. Deeper flanges are desirable, and one of them might be fitted as a loose flange to accommodate slight variations in chart width.

The chart is driven by a single expanding spiked pinion, by means of which the drive can be adjusted for variations in the time ruling of various batches of charts.

This type of drive was criticised in the Fifth Report (p. 223), and our further experience with it would confirm the opinion that it cannot be considered as a reliable drive for a recorder which it may be desirable to leave unattended for several consecutive days. The drum-driven chart, whether in the form of a single chart firmly secured to the surface of a drum, or a roll chart fed by friction over a drum, seems to be so much more certain in its action, as to compensate for its inability to adapt itself to such variations in time ruling of the chart as are likely to be met with in practice.

The track of the driving pinion is marked by a series of pricks on the chart, which enable a zero correction to be applied if the chart moves laterally between the guides. It is to be noted, however, that the pen marks and the pin-pricks to which they correspond are separated by about one hour on the chart.

It would be a useful addition if the recorder were provided with an auxiliary detachable scale which gave the actual B.Th.U. values to the main sub-divisions of the chart, since they can be given any value at will, depending upon the value given to the centre line. Means are provided for altering the ratio of the chart B.Th.U. to B.Th.U. deduced from thermometer readings. The pen can also be moved to any part of the chart by its zero-adjusting mechanism without altering this ratio. If much movement is necessary to set the pen so that the chart B.Th.U.s agree with the thermometers, care should be taken that none of the links of the pen mechanism are binding. As sent out by the makers there is little chance of binding, for the links are in the form of a rough rectangle when the pen is at the centre of the chart. The pen is very well balanced, and there does not appear to be as much "backlash" in the mechanism as would account for a variation of more than 1 B.Th.U. on a change from a rising to a falling C.V.

RECORD SHEET.

Mr. Fairweather has drawn up a printed form upon which to record the performance of his Recording Gas Calorimeter.

The original is a foolscap sheet, with printed headings and ruled as shown.

In general this sheet would appear to be excellent for summarising the behaviour of the instrument. For the special purposes of our tests, however, we drew up a detailed sheet, recording more complete data, particularly with regard to the analysis and sub-division of the "errors" columns.

It is suggested that the data in the columns marked "error" should be uniformly given in the form of a *percentage* error, as this facilitates the analysis of the record.

Columns 1-7, inclusive, require no comment. Column 8 is for checking the rate of the meter, but there might, in addition, be a column for notes as to the correctness or otherwise of the meter capacity as well as its rate, in this section. Column 10 is supposed to indicate in some measure the effectiveness with which all parts of the apparatus are brought to a common temperature—that of the inlet water to the calorimeter. In point of fact it is only essential that the tabular device and the meter should agree in temperature, agreement with calorimeter inlet water temperature being of secondary importance.

Columns 11-13 require no comment.

"Fairweather" Recording Calorimeter.

Date.	Time.	Meter Temp. °F.	Tabular Control.				Gas Meter.			Water Control.		
			Barometer	Tabular No. of Gas in Meter.	Tabular Gauge Reading.	Error.	Rate Stan'rd = 240 Secs. for 4 Revs.	Error.	Temp. diff. between Inlet Therm & Meter.	Theorl. = 2000 × Gauge Reading.	Actual c/cs in 4 Mins.	Error.
1	2	3	4	5	6	7	8	9	10	11	12	13

Calorific Value.						Temp. of Exit Gases from Calr.	Room Temp.	Check Tests.		Remarks.
Thermometers.				Chart Read'g.	Error.			Boys' Calor.	Time.	
Inlet °C.	Outlet °C.	Diff.	Equiv. B.Th. U.s.							
14	15	16	17	18	19	20	21	22	23	24

The main headings for Columns 14-19 might be given preferably as "Recording Mechanism," since the data recorded merely allow a check of the accuracy of the differential air thermometer, and *not* of the recorded calorific value of the gas. "Error" in Column 19 is not necessarily the error in the C.V., but in the difference between the mercury and air-thermometer indications respectively. It is understood that the temperatures to be recorded in Columns 14 and 15 are the means of a number of readings, adjusted for any corrections the thermometer certificates might indicate.

Columns 20 and 21 provide data which may be useful upon occasion for supplementary calculations. Column 22 is for recording the result of a complete test upon the non-recording portion of the instrument. Although it involves some repetition, it would be an advantage to place a duplication of Column 19 beside Column 23, with an additional column showing the difference between the two, which, to the best of our knowledge, is the absolute difference between the real and the recorded C.V.

The space for "Remarks" leaves little room for writing more than some key letter or number, giving reference to more extensive remarks written conveniently on the back of the record.

The following are the more important points which might find notice under the heading "Remarks":

1. Any opening of the air valve to drop the tabular gauge to 1·000, with note of addition of oil, removal of water and point to which re-set when sealed.
2. Cleaning of water jet and adjustment of position of cup on float spindle.
3. Alterations to length of pendulum, to load on governors or adjustment of water line of meter.
4. Dates when unions of air thermometer opened.
   Adjustments of pen-ratio on chart, or adjustments of pen-zero.
5. Cleaning of calorimeter.
6. Any interruption of the record or untoward circumstance likely to cause the record to be unreliable.

(To be continued.)

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

The Birmingham Medal.

Sir,—The members of the Institution will generally approve of the selection of Mr. Doig Gibb, who is held in universal affection. Apart from Mr. Gibb's services during the war, he has always been a great man in the industry.

What strikes me, however, is the absence of one name from the roll of honour. To my mind, the moment is overdue for the investment of Dr. Carpenter. It is not for me here to state his outstanding claim, except to say that, in my judgment, Dr. Carpenter has rendered unrivalled services to the gas industry.

My view is, I am sure, shared by many in the industry.

The Hydro, Bournemouth West, April 21, 1923. R. W. Edwards.

[In the editorial last week on the subject of the "Birmingham Medal," we wrote: "There are other men whose work entitles them to similar recognition—men who have done much, and are doing much, to advance the interests of the industry. We will not mention them by name; they are well known. They must not be overlooked; they cannot be." At the top of the list in our mind was the name of Dr. Carpenter; and, in view of Mr. Edwards' letter, we may say now that, within the past few weeks, it has been mentioned more than once to us in connection with this particular honour.—Ed. "G J."]

Therm Calculations.

Sir,—It may interest the staffs of those companies who have adopted the therm basis of supply to know that their therm tables may be utilized for finding both the equivalent value of the therm and/or charge per 1000 c.ft. All that is necessary is to regard both the cubic feet and the therm equivalent as pence.

Rebates can, of course, be dealt with in the same manner; and corresponding figures of any value from 0·1 of a penny can thus be readily ascertained.

Examples.

	Standard.	Price per Therm.	Table Figures.	Price per 1000 C.Ft.
		d.		s. d.
Gas . .	4·50	8·6	(8·600 c.ft. = 38 70 therms)	3 2·7
Rebate .	,,	2·5	(2·500 ,, = 11·25 ,,	11¼
	Per 1000 C.Ft.			Per Therm.
	s. d.			d.
Gas . .	5·00	3 9	(45·00 therms = 9·000 c.ft.)	9

Special Calculations.

Time and labour will be saved if the therms are taken as shillings and/or pence as required. For instance, the whole of the figures in the following example A are nearly as few as those contained in B's totals alone. The figures in brackets are merely used for the purposes of illustration, and do not count.

Find the value of 52·20 therms at 7·9d.

A.	£ s. d.	B.	
(52·20 *taken as pence*) .	0 4 4·2 (× 8)	52·20	
	1 14 9·6	7·9	
less		365·40	
(1/10 of 52·20d.)	0 0 5·2	46·98	
	£1 14 4·4	412·38	
		34·4	£1 14 4·4

What is the value of 52·20 therms at 11·6d.?

	£ s. d.
(52·20 *taken as shillings*)	2 12 2·4
less	
(1/10 of 52·20d.)	0 1 8·9
	£2 10 5·5

E × D. 1200·00 therms at 6·7d.	£ s. d.
(1200d. = 100s. = £5) £5 × 6	= 30 0 0
(120d. = 10s.) 10s. × 7	= 3 10 0
	£33 10 0

Bournemouth Gas and Water Company, April 23, 1923. G. W. Limmer.

REGISTER OF PATENTS.

Low-Temperature Carbonization.—No. 184,144.

Koppers, H., of Essen-Ruhr.

No. 13,064; May 9, 1922. Convention date, Aug. 1, 1921.

The fractional distillation of solid carbonaceous matter at moderate or low temperatures is accompanied by considerable difficulties, whether external or internal heating is employed, for the reason that on the one hand a certain maximum temperature must not be exceeded, and on the other hand it is necessary to heat adequately all parts of the charge in the oven, retort, or still. According to this invention, the carefully regulated, well distributed heating of the material is effected by introducing into the distilling chamber, together with the charge, solid foreign bodies which have previously been heated to the necessary temperature and act as transmitters of heat, such solid bodies being used in sufficient quantity to effect the required distillation. These solid bodies are separated from the fuel after the distillation process, to be re-used after being re-heated.

With this process it is possible to regulate the distillation with great accuracy, not only in regard to the maximum temperature attained by the charge, but also in regard to the quantity of heat imparted, so as to ensure the best conditions for distillation at moderate or low temperatures as for the production of low-temperature tar.

The process is preferably performed by a continuous method, in which the heated solid bodies are introduced, together with the fresh charge, at one end of the distilling apparatus and pass out at the other end. The most suitable apparatus for this purpose is a revolving drum of a kind commonly used in this class of work, furnished with a worm inside which conveys the fuel, together with the solid bodies, from the receiving end to the delivery end. During this process the heat-transmitting solid bodies, which may be steel balls, serve also the purpose of preventing or reducing the caking of the fuel which is liable to occur when this fuel assumes a plastic condition.

Fig.1

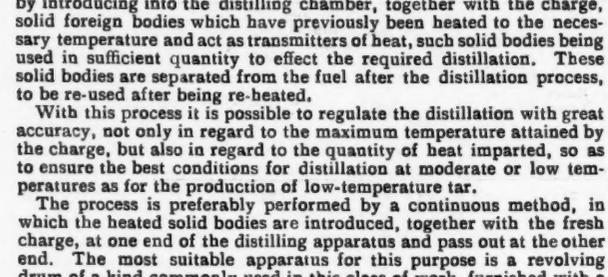
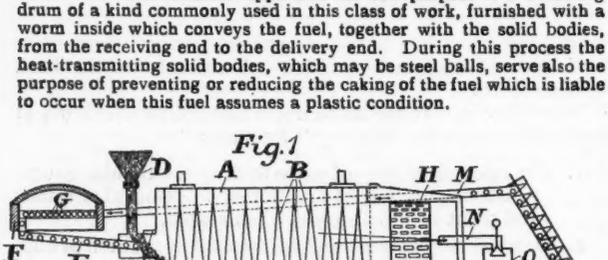


Fig.2.



Koppers Apparatus for Low-Temperature Carbonization.

Apparatus suitable for carrying out the process is shown in fig. 1 in longitudinal section and in fig. 2 in plan.

The revolving drum A is furnished on the inside with a worm B, and is connected at one end by means of a gland C with a hopper D for the introduction of the charge, and also with a feed duck E for the balls G, heated in the oven or furnace F. The balls, having a diameter of about 100 to 125 millimetres, are heated to about 800° C., and are fed into the revolving drum A with the coal, in the proportion of four to one by weight. At the delivery end the semi-coke is discharged through the meshes of a screen H, forming part of the drum, and passes through a hopper I onto a conveyor K; while the balls G pass out through a covered channel L and travel by gravity to a worm conveyor or other equivalent mechanical hoisting device, which carries them to the upper end of an inclined and enclosed runway M, down which they run by gravity to the oven or furnace F, to be heated up again for re-use. The gases of distillation are drawn off at the discharge end through a pipe N and pass into the main O. The drum may be slightly inclined to accelerate the screening action and the grinding up of the semi-coke by the balls. In order to prevent heat losses the drum and the runway M are suitably insulated, so that practically only the amount of heat actually required for the distilllation process need be supplied by the furnace F.

Bomb Calorimeters.—No. 194,554.

Brown, E., of Holloway.

No. 8468; March 23, 1922.

This invention relates to improvements in bomb calorimeters for use in determining the calorific value of combustibles such as fuel oil, coal, coke, and the like. It has for its object a construction wherein the various ports for the admission and exhaustion of the gas and gases and the admission of the cables and other connections may be arranged to eliminate the possibility of leakage. A further object of the invention consists in an improved arrangement of the lid or cover which eliminates the necessity of the employment of heavy tools in securing the cover to the body of the calorimeter in a gas-tight manner.

According to the general principle of the invention, the inlet and exhaust ports for the gas or gases, and the valves controlling the same, and preferably the electrodes through which the substance or fluid to be treated is fired, are located around the body of the calorimeter at a point between the top and the bottom and preferably centrally thereof or slightly below the centre. The two electrodes are arranged on opposite sides of the body, and are adapted to serve as supporting means for the crucible in which the material under treatment is located. These electrodes are constructed so that not only is the crucible supported in the appropriate position but is also secured against displacement or tilting.

This calorimeter has many advantages over calorimeters as at present constructed. With the existing apparatus, the electrodes and the inlet and exhaust ports and valves controlling the same are all mounted in, and carried by, the lid or cover, which has a screw-threaded engagement with the body. In order effectively to secure the lid or cover in position, relatively large spanners or tools have to be employed; while the body of the apparatus has to be secured or retained while this tool is being manipulated. As the cover has to be secured after the crucible has been placed in position, an accidental blow or slipping of the tool or body very often causes the displacement of the crucible or its contents. By the construction according to this invention this difficulty is overcome; and the manipulation of the apparatus is further assisted by providing it with a cover. The top of the vessel is provided with an elliptical opening the periphery of which on its under side forms a seating for a similarly shaped lid inserted therein and drawn up upon its seating by a pivotal bridge piece and screw and nut mechanism. By this means the employment of spanners and other heavy tools is dispensed with.

The body of the calorimeter is of cylindrical form, and is provided slightly below its centre with an annular flange or enlargement in which the various ports, valves, and electrodes are located. The annular flange on the body is provided on diametrically opposite sides with screw-threaded apertures in which the electrodes are inserted, one of the electrodes being insulated from the body. These electrodes project into the body of the calorimeter towards the centre, and are shaped towards their ends to engage with trunnion like members on the crucible which they serve to support. Preferably one of the trunnion like members is provided on its under side with a rectangular recess to fit over a correspondingly shaped portion of one of the electrodes; while the other may be similarly formed and supported. Alternatively one or both of the trunnion-like members may be formed of rectangular cross section to fit into a rectangular recess in the upper surface of the inner end of one of the electrodes; the engagement of the parts being such that the crucible cannot tilt with relation to the body. The flange is further provided with inlet and exhaust passages closed by screw threaded plugs. These passages communicate with valve chambers, each provided with a screw operated needle valve co-operating with a conical seating. The needle valves are provided at their inner ends with packing washers located in suitable recesses in the inner surfaces of the packing glands in which the valves are mounted. The electrodes may have the portions which support the crucible made adjustable, so as to suit crucibles of varying sizes.

It is claimed that the possibility of leakage is reduced to a minimum, the manipulation of the apparatus is simplified, and the carrying-out of research operations is greatly simplified.

Calorimeters.—No. 195,180.

The Board of Trade and Boys, C. V., of Victoria Street, S.W. 1.

No. 194; Jan. 3, 1922. Patent of Addition to No. 180,080 of Feb. 24, 1921.

The invention relates to that part of the prior invention which has to do with the accurate measurement and recording of the heat produced by combustion. The gas and the water of the flow calorimeter may be measured as therein described or in any satisfactory way. These elements are not part of the present invention, which consists in an improved construction of heat interchanger made of sheet material wherein ease of construction, compactness, and durability are attained, very small water content becomes possible, and occasional dripping of condensed water from a pimple of incrustation formed above the flame is wholly prevented.

The invention consists further in an improved construction of the operative thermometer, whereby the exposure of even a small portion of the liquid contents outside the circulating water is wholly avoided and in which the lever system is carried by the metallic structure and neither directly nor indirectly by the lid of the calorimeter casing, thus avoiding small possible inequalities. It consists also in the arrangement of the levers in planes mutually perpendicular, whereby the necessity for making the two thermometer bulbs of unequal capacity to compensate for the varying temperature of the inlet water, as in the former application, is avoided. The invention further consists in supporting the integrating frame on a pivot, whereby the friction is reduced, and in allowing the integrating wheel pivoted in a hinged frame carried by the lantern to rest by its weight, or by a portion thereof, upon the integrating drum. These latter features relate only to recording mechanism; but the improved heat interchanger first mentioned is of general application. It consists also in means for regulating the humidity of the air for combustion whereby certain small errors are, for the first time, eliminated or reduced.

The heat interchanger is made of sheet metal, preferably of lead autogenously soldered for continuously recording calorimeters; but other metals such as copper or brass, soft soldered, might be used for instruments not in continuous use. Lead autogenously soldered is well known to resist the destructive action of the sulphurous vapours of burning gas and so is preferable, more especially for continuous use. It will be evident that other material than metal which can be made into sheets and joined, and which is sufficiently heat conducting and incorrodible, might be used for the interchanger.

The operative thermometers are of simplified construction, and the

hot and cold thermometers are identical in capacity and form, and are made without connecting pipes and separate aneroid diaphragm boxes.

When the improved construction of interchanger is used in a non-recording calorimeter the operative thermometers are not required, and mercurial thermometers are placed directly in the entering and leaving water, and only narrow water tubes are then required instead of the large vessels needed by the operative thermometer.

Means are provided whereby a source of error not hitherto adequately counteracted may be eliminated; but as the nature of the error is not very commonly understood, the patentees think it desirable to explain it. When gas is burned in air, the volume of the products of combustion when cooled is not equal to that of the gas and air together before combustion, but is less; the exact amount of contraction depending on the composition of the gas. This contraction may give rise to error more or less, and positive or negative according to the hygrometric state of the air. If, by way of example, the volume of air is seven times that of the gas before combustion and the contraction is one eighth of the whole so that the volume of the gas disappears, then if the air before combustion is six sevenths saturated with water vapour and the gas after leaving the wet meter is saturated, the products being necessarily saturated, the amount of water leaving as vapour will be equal to that entering as vapour, and only in such case the error referred to does not arise. If, however, as in dry weather, the air is less than six sevenths saturated, then more water leaves the calorimeter as vapour than enters it as vapour, and the heat necessary to convert this amount of water into vapour at the temperature of the effluent gases is abstracted from the calorimeter, and to this extent the record is too low. Conversely, if the air is more than six sevenths saturated, vapour is condensed in consequence of the contraction and generates heat which was not caused by the combustion of the gas, thus making the record too high. Further, the higher the temperature at which the cold water enters the calorimeter the greater will be the error positive or negative due to this cause.

So far as the patentees are aware no attempt has been made to correct for this error, but saturation of the incoming air has been employed ensuring too high a result at all times. The whole error due to contraction is never great, but it is persistent. In moist climates like that of England, this error is seldom serious; but in dry countries, such, for instance, as the east side of America, the negative error may amount to a considerable fraction of 1 p.ct. Means are provided for avoiding this error, or at least reducing it to a great extent.

The specification is a lengthy one, and diagrams are given which explain the application of the above statements.

The patentees claim:

1. A calorimeter including a heat interchanger comprising two series of ducts, each of the ducts of one series being separated from adjacent ducts of the other series by a single separating wall of sheet material folded alternately inwardly and outwardly and surrounding a combustion space.

2. A calorimeter heat interchanger as claimed in claim 1, wherein sheet lead constitutes the separating wall.

3. A calorimeter heat interchanger as claimed in claim 1 or claim 2, including a roof of sheet material and an incorrodible element disposed beneath this roof.

4. A recording calorimeter constructed in accordance with any of claims 1 to 3, and including an operative thermometer formed of a rigid cylindrical vessel provided at one end with a resilient disc and hermetically sealed.

5. A recording calorimeter constructed in accordance with any of claims 1 to 4 and including an operative thermometer formed of a rigid cylindrical vessel provided at each end with a resilient disc, a fixed abutment supporting the centre of one disc, and adjustable operative means abutting the centre of the other discs.

6. The combination in a recording calorimeter constructed in accordance with any of the claims 1 to 5 of two identical hot and cold operative thermometers, a separate lever operatively connected to each, and a third lever co-acting with the first-mentioned levers to operate in the third dimension of space.

7. The combination in a recording calorimeter constructed in accordance with claim 1 and incorporating a drum and disc integrating device of a pivotal lantern framework, supporting means for this framework independent of the integrator drum, and a partly balanced supporting frame for the integrator disc rigid with the lantern framework.

8. A method of ensuring a constant degree of water vapour saturation in the air employed for combustion in a recording calorimeter constructed in accordance with claim 1, which consists in automatically mixing together prevailing atmospheric air and saturated atmospheric air in varying proportions in accordance with prevailing hygrometric conditions of the atmosphere.

9. The combination in a recording calorimeter constructed in accordance with claim 1 of a combustion chamber, an inlet duct for the conveyance of air for combustion therein, a duct communicating with the inlet duct and with the prevailing atmosphere, a further duct communicating with the inlet duct and with an air-saturating chamber, a throttling device co-acting with each of said last-named ducts and hygrometric operating means, preferably including a water tumbler in said chamber.

10. A recording calorimeter constructed in accordance with claim 1, incorporating an air-saturating chamber, which includes a conduit for the prevailing atmospheric air, hot and cold water supply means connected to said conduit, an outlet orifice, throttling means co-acting therewith, and hygrometric means effecting the automatic operation of said throttling device.

11. In combination, the improved calorimeter heat interchangers, operative thermometers, integrator suspensions, air humidity regulating devices described with reference to the drawings.

Gas Controllers.—No. 195,312.

GUNNING, J., of Bournemouth.

No. 17,591; June 26, 1922.

This invention relates to clock-driven mechanism for actuating gas-valves or equivalent devices, such as electric switches, at predetermined times. Such mechanisms are usually provided with a timing-disc adjustably clamped on the 24-hour arbor of the clock, and one or more adjustable tappets which can be clamped in any desired position on the timing-disc, and which actuate the valve or other mechanism.

The primary object of the invention is to provide a mechanism of this kind which will run without rewinding for a week, or longer, and which is adapted to omit functioning in the normal way on Sunday or other non-working day, but to resume its normal function without further adjustment on the next day. The particular object in view is to provide means for turning on the heating gas for the metal pot of typographic machines, so that they may be in readiness for the arrival of the workmen at a definite hour on each working day, pretermitting Sunday or other non-working day.

The timing disc, which is adjustably clamped on the 24-hour arbor of the clock, is provided with a single tappet having a range of adjustment embracing practically the whole length of the disc. A driving stop is arranged to co-operate with the tappet in such a way that it is possible, at, say, one o'clock in the afternoon of any day preceding a non-working day, by suitable adjustment of the timing-disc and by unclamping the tappet and leaving it loose on the disc, for the clock to run through the whole of the following day. At the normal functioning hour on the second day, the loose tappet, being pushed round in front of the driving stop, which is preferably adjustable on the timing disc, again operates the valve. The latter, which may be arranged to open by the action of a spring or by gravity, when a latch which holds it in the closed position is released by the tappet, is re-set by hand after each functioning of the device. The spring or other closing force is automatically energized by the re-setting operation.

Actuating Gas-Valves.—No. 194,506.

WALLACE & CO., of Croydon.

No. 3661; Feb. 8, 1922.

This invention relates to means for actuating gas valves or cocks, and is intended for application primarily for gas rings and the like used for cooking and other heating purposes of the type in which the placing of the utensil on the ring depresses the inner end of a rocking lever which operates the main gas-valve. The object of the invention is to simplify and cheapen the construction of such apparatus.

According to this invention, the rocking-lever is provided with a screw at its inner end for adjustment purposes, an ordinary band clip is provided to facilitate the mounting of the lever on ordinary gas rings and the like, and the rocking lever is provided with a row of holes whereby the position of its fulcrum relatively to the clip can be adjusted.

Plate Racks for Gas and Oil Stoves.—No. 194,523.

OAKLEY, P., ALLENDER, J. J., and STOVES, LIMITED, all of Warrington.

No. 5274; Feb. 23, 1922.

This invention relates to plate and like heating racks for gas and oil cooking stoves. In some forms of rack a rectangular frame is used having transverse spaced bars or rods of metal between which the plates are placed; the lower edges of the plate being directly supported by a pair of longitudinal spaced rods located below the frame or by other means. This invention relates particularly to this type of rack, and consists essentially in the combination with the rectangular spaced-bar frame of a sheet of wire or like netting located below the frame to support the lower edges of the plates.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for April 18.]

Nos. 9610 to 10,229.

BERTUCCIOLI, T. B.—"Valves closing after predetermined interval or flow." No. 10,202.

BREMNER, A. J.—"Gas compressors." No. 9984.

BRITANNIA FOLDING BOX COMPANY, LTD.—"Gas-mantle boxes." No. 9861.

FLAVEL, P. W.—"Gas-burners." No. 10,009.

FORD, F.—"Gas pendant, bracket, or gas-fire tap." No. 9916.

GREENHOUGH, W. J.—"Gas-stoves, &c." No. 9836.

GRIFFITHS, H.—"Dry gas-meters." No. 9687.

HART, J. T.—"Gas-meters." No. 9761.

HELPS, G.—"Gas-stoves, &c." No. 9939.

HEYL, G. E.—"Boiler, &c., furnaces and distillation of oil-shale, coal, &c." No. 10,204.

INGLEFIELD, Sir E. F.—"Valves or taps for controlling liquids." No. 9806.

MACLAREN, R.—"Gravity electrical piston gas-valves." No. 10,072.

MAGEE, J.—"Means for locking pipe unions." No. 10,200.

MARKS, E. C. K.—See Griffiths, H. No. 9687.

PEHRSON, A. P.—"Rotary gas-producers." No. 9883.

PICKARD, G. G.—See Britannia Folding Box Company, Ltd. No. 9861.

PURVIS, G.—"Gas-producers." No. 9625.

RADIATION, LTD.—"Automatic gas-regulators." No. 10,220.

RIDER, D.—"Dehydration and distillation of tar or oils." No. 9779.

SOUTHEY, A. W.—"Gas-cookers." No. 9650.

STOCKMAN, H. A.—"Apparatus for distilling carbonaceous materials." No. 10,010.

STOER, C. E.—See Bertuccioli, T. B.—No. 10,202.

THERMAL INDUSTRIAL AND CHEMICAL (T.I.C.) RESEARCH COMPANY, LTD.—See Rider, D. No. 9779.

ULLGREN, J. D.—See Pehrson, A. P. No. 9883.

VALENTE, A.—See Bertuccioli, T. B. No. 10,202.

YATES, H. J.—See Radiation, Ltd. No. 10,220.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

Smethwick Corporation (Gas) Bill: Committed.

Hoylake and West Kirby Gas and Water Bill: Brought from the Commons; read the first time; and referred to the Examiners.

HOUSE OF COMMONS.

Progress of Bills.

Hoylake and West Kirby Gas and Water Bill: As amended, considered; read the third time, and passed.

South Oxfordshire Water and Gas Bill: Reported, without amendment; to be read the third time.

Co-Partnership Bill.

A Bill to promote the more general adoption of co-partnership between capital and labour by statutory and other companies was presented on Tuesday of last week, and read the first time.

Gas Regulation Act.

A copy was presented of Rules (dated April 16, 1923) made by the Board of Trade with respect to applications for amending Orders, under sub-section (3) of section 1 of the Act.

Public Utility Companies (Capital Issues) Act.

Copies were presented of reports on applications to the Board of Trade under the Act by the Annfield Plain and District Gas Company, the Banbury Gas Light and Coke Company, and the Godalming Gas and Coke Company.

SOUTH OXFORDSHIRE WATER AND GAS BILL.

This Bill was ordered to be reported for third reading by the Unopposed Committee of the House of Commons—presided over by Mr. J. F. Hope (Chairman of Ways and Means)—on Thursday last. It has already passed the House of Lords, as recorded in the "Journal" for March 21, p. 772.

Mr. Sedgwick (Messrs. Rees and Freres, Parliamentary Agents) said that the Bill, promoted by the South Oxfordshire Water and Gas Company, was almost entirely a financial one. The Company were incorporated in 1905, and took over an existing undertaking. The area of supply was mainly rural, and the Company had been very unfortunate financially, not having paid any dividends, either on the ordinary or preference capital, since 1907. Though the prospects were improving, and the population of the area of supply increasing, the Company felt that, with the large amount of existing capital, it would be almost impossible to go to the public for new capital to meet the growing demands. The shareholders had therefore decided among themselves that the proper course was to write-down the existing capital, which was the main object of the Bill. It had been approved unanimously at meetings of ordinary and preference shareholders of the water and gas capital. In the case of the water capital, of which there is authorized £233,333 (the total share and loan capital received, including premiums, being £82,718), it was proposed to write-down all the ordinary shares from £10 to £3, entitled to a maximum dividend of 8 p.ct. There were 10 p.ct. and 7 p.ct. ordinary shares, which were both to be made ordinary water stock—*i.e.*, for one share of £10 would be given £3 of stock. It was also proposed to convert the preference to ordinary stock, and write it down by 50 p.ct. For every preference share of £10, ordinary stock of £5 nominal value would be given. The gas capital was treated in exactly the same way. The authorized capital was £24,000, and the total share and loan capital received (including premiums) £14 990. The gas ordinary shares were subject to a sliding-scale; and new ordinary stock would be issued for the existing ordinary and preference shares. This would also be subject to the existing sliding-scale. The Company already had a Therm Order.

The Chairman asked what would happen if things turned out to be better than was expected; and the Company were in a position to pay more than 8 p.ct.

Mr. Sedgwick said that, in the case of the gas shares, the dividend on the ordinary stock could not be increased unless the price of gas were reduced. The 8 p.ct. was the maximum dividend in the case of the water capital, and the standard in the case of the gas capital. There was one other proposal to help the finances of the Company—a clause to empower them to issue preference stock for debentures now existing. The water debentures amounted to £20,500, and the gas debentures to £3700.

Sir Ernest Moon, K.C. (Speaker's Counsel), referring to the power which the Company retain to raise further capital already authorized, asked whether it was the intention to raise further capital when the Bill was passed.

Mr. Sedgwick said it was not meant to do so immediately, but the Company might in a short time.

Mr. Alfred Morland (Managing-Director of the Company) proved the preamble of the Bill, and the Committee decided as stated.

One of the biggest fires experienced in the Oldbury district for several years occurred on the 29th ult., when the premises of Cornopolis, Ltd., were almost completely destroyed. It is supposed that the fire was caused by the fusing of an electric wire igniting some hay or straw. The damage is estimated at several thousand pounds.

LEGAL INTELLIGENCE.

CROSS v. IMPERIAL CONTINENTAL GAS ASSOCIATION.

On Monday, a motion of considerable importance to the shareholders and debenture holders of the Imperial Continental Gas Association came before Mr. Justice Romer, in the Chancery Division of the High Court of Justice.

Mr. Hughes, K.C., and Mr. Hodge appeared for the plaintiff; Mr. Clauson, K.C., and Mr. Howard Wright, for the defendants.

Mr. Hughes said the object of the motion was to obtain a decision upon the question whether the ordinary stock holders of the Association were entitled to take certain moneys by way of dividend without providing for payment of the debenture stock charged on the undertaking. The plaintiff, who was both a debenture holder and shareholder in the Association, asked for a declaration of right. Every facility had been given to him by the defendants to enable the matter to be conveniently brought before the Court. The case was of considerable importance, as a large sum of money was involved. The question was purely one of law, which all parties were anxious to have determined at the earliest possible moment. The Association originated in a partnership formed about 1824 (which was very early in the history of gas lighting) to light various towns and cities, chiefly in Germany. The undertaking was a large and prosperous one, and later on was constituted under the Companies Clauses Consolidation Acts. The Association issued a considerable quantity of debenture stock, which was subsisting in 1914, when the war began. Not unnaturally, the war had considerable effect on the German works. The German Government seized different undertakings, which they sold. A claim was ultimately made under the Treaty of Peace; and a very large sum of money had been recovered through the Claims Office, which was now available for distribution, as the German undertakings had come to an end. The question to be determined was whether the debenture holders were entitled to be paid out of the money, or whether the ordinary shareholders should receive the money by way of dividend. They said that the accounts, if analyzed, would show that there was a large sum of accretion to capital which represented undistributed profits, and should be divided among the ordinary shareholders without reference to the debenture holders.

Mr. Clauson said his point was that it was quite clear the capital, even after the proposed distribution was made, would be over-represented by available assets; and he should contend that this was an accretion to capital, still leaving the debenture stock intact.

His Lordship: Do the debenture stockholders say that it should be applied to their stock, and that the ordinary shareholders are not entitled to it?

Mr. Hughes: They say, in the first place, it is not money available for distribution as dividend at all, and that, having regard to the Companies Acts, the money cannot be paid to the ordinary shareholders until the debenture holders are paid—that the money is, in fact, mortgaged to the debenture holders. There is a statutory power to reduce capital by repayment of money to the shareholders; but that is only on the terms of paying off a proportionate part of the debenture stock.

Mr. Clauson remarked that the Association had acted upon that power once.

Mr. Hughes said they treated it as a return of capital, and returned a large sum to the shareholders, and also a large sum to the debenture holders in respect of their stock; but they had now thought of a better plan, and the question was whether or not they were entitled to carry it out. The Association began with a partnership, and there were several Private Acts; but none before 1870 was material to the present case. It was sufficient to say that, by the Act of 1845, the Association had power to borrow money on mortgage or bond, the mortgage being an actual mortgage of the works; and no portion of the capital could be returned without the consent of every mortgagee. By the Act of 1863; the Association acquired power to create debenture stock, the interest on which was to be a charge on the undertaking or works; and authority was given by the Act to appoint a Receiver in case the interest fell into arrear. In 1870, when the capital was £1,400,000 and the debenture issue £122,500, an Act was obtained enabling the capital to be doubled. In 1878 the whole of the debenture debt had been paid off; and an Act was secured enabling the Association to return capital not required for the purpose of the undertaking. The power to borrow was limited to £500,000; and later an Act was passed enabling the Association to borrow to the extent of one-fourth of the capital stock. In 1893, £350,000 was borrowed at 3½ p.ct. interest. A further Act was obtained giving the Association power to dispose of certain parts of their undertaking. Under the Treaty of Peace, a sum of about £5,000,000 was paid; and it became important to consider what should be done with it. The Directors proposed, and the proprietors approved of, a large return to the shareholders—viz., 60 p.ct.—which was effected by reducing the capital to £1,976,000. The debenture holders received 65 p.ct., reducing that debt to about £400,000, which was the sum now outstanding. A little later the claim against the German Government was settled at £1,600,000, of which £240,000 had been paid; and naturally the debenture holders expected to be paid off at 105. But the ordinary shareholders said that if the Association had written-down the cost of the assets, and more than the book value was obtained, this was an accretion of capital which was entitled to be considerad as attributable to dividend. The Association were really reducing their capital by paying-back money which was not now required. His submission was that any company governed by the Companies Clauses Consolidation Act could not touch as dividend the proceeds of sale of part of their undertaking, however the accounts were made up, as the proceeds of sale were no part of the revenue. The debenture stock was a specific charge on the works of the Association, and the money paid by the German Government represented part of those works. They were in the position of a mortgagor who had sold the property; and the first thing to do was to pay off the

mortgagee. If the Association wished to return capital, they must do it under the provisions of the Act, which required them at the same time to pay off a proportionate part of the debenture stock.

His LORDSHIP said the only question he had to decide was whether the Association could distribute by way of dividend an accretion of capital such as here existed.

Mr. HUGHES: Whether a company can apply in payment of dividend the proceeds of sale of a part of the works, which, as the Association said, had been constructed out of revenue. He admitted that the Association had substantial assets, and that the debenture holders were more than amply secured; but this did not in any way affect the question at issue. Having cited various decisions in support of his contention that plaintiff was entitled to the relief claimed, Counsel submitted that, where a company sold the whole of their undertaking, the first charge upon the assets was the debenture debt; and the same rule applied where only a part of the undertaking was sold. The shareholders could not receive any part of this money without paying the debenture debt in full. If he was wrong in this contention, then he submitted that, in returning capital, the Association were, in fact, reducing their capital, which they could not do without paying off a proportionate part of the debenture debt.

Mr. CLAUSON submitted that plaintiff, as a debenture holder, had no cause of action, as his security was not in jeopardy; and as a shareholder his only cause of action would be by alleging that capital stock must be construed as meaning any assets which had been acquired by the capital originally put up by the shareholders, however much it had been afterwards increased. What was the restriction contained in the Companies Clauses Act Consolidation Act upon the distribution of the assets among the shareholders? The only restriction was that contained in section 121 of the Act of 1845—that the Association should not make any distribution among the shareholders whereby the capital stock of the Association would be materially reduced.

When the hearing was resumed yesterday morning,

Mr. CLAUSON submitted that the Association were not proposing to make any distribution which would reduce the capital, which was the only restriction placed by the Companies' Clauses Consolidation Act upon a distribution of assets; that there was nothing illegal or *ultra vires* in the proposed action; and that the debenture holders had no right to interfere or complain.

Mr. HUGHES having been heard in reply,

His LORDSHIP said he would take time to consider his judgment.

USING A POWER SUPPLY FOR LIGHTING.

The County Magistrates lately heard a case in which the Reading Gas Company summoned Harry Jewell, of Shinfield, for fraudulently using for lighting gas supplied for engine purposes.

Mr. E. BLANDY, prosecuting for the Company, said their contention was that by a manipulation of pipes, defendant was able to get gas into his house through his engine meter. There was a difference between the engine rates and those for lighting of 5d. per 1000 c.ft. On March 7 tests were made at the premises by the Company's officials, and the results showed that, so long as the engine meter was turned off, no gas was available in the house though the lighting meter was open. So soon as the engine meter was turned on, there was a supply of gas in the house. The onus was on the prosecution to prove that this tampering with the pipes was done wilfully and fraudulently. The defendant was an engineer, who should know what he was about. The concluding part of the section under which these proceedings were taken said that "the employment of artificial means should be *prima facie* evidence that such consumption of gas was done fradulently and wilfully." In the dwelling-house itself there was an old service-pipe laid as far back as 1907, and the use of which was discontinued in 1912. This had been deliberately tampered with; a cap fitted by the Company having been drilled through.

Mr. *Douglas H. Helps* (the Company's Engineer) stated that the defendant went to the works, and after giving his reason for making the connections, offered to pay anything he owed and the Solicitor's expenses. The reason he gave was that he wanted an additional supply to the engine.

Further evidence was to the effect that from the two meters there were two separate pipes—a 1¼ in. service which supplied gas to the engine and a 1 in. service which continued through the garden to the dwelling-house. In a corner of the workshop was a pipe connecting the one service with the other, and just above the ground a valve enabling the gas to be turned on or off. A piece of matchboarding concealed this pipe. The effect of this alteration was that all gas passed through the engine meter, whether used for lighting or not. In 1912 and 1913 he had been cut off for non-payment of his gas account; and since then his consumption had been very irregular and difficult to understand. In 1910, 1911, and 1912 his average consumption was about 130,000 c.ft.; while in 1921 and 1922 it was only 19,800 c.ft. and 36,200 c.ft. respectively.

Defendant gave evidence, and said Mr. Helps knew about what was done in connection with the service pipe. As regards the consumption, he had almost closed his shop during the war; and after the war the pressure became so bad that he installed an oil-engine, and little gas was used. The Company had lost nothing at all.

Cross-examined, he said he had offered to pay the costs in order that the matter might be cleared up. By connecting the two pipes better pressure was obtained. He admitted it was possible to get gas into the house when the lighting meter was turned off.

The Magistrates considered the case amply proved, and fined defendant £5 and £2 costs.

Gas-Meter Registration Action.

In the Burton-on-Trent County Court, last Wednesday, the Swadlincote Urban District Council brought an action against Edgar Bennett, a publican, claiming £22 10s. for gas supplied. The contention was that the gas-meter had slowed down and so favoured the consumer. It was urged on behalf of the Council that the meter was found to have stopped registering altogether. His Honour Judge Newell said this was a very fortunate meter to have. Mr. Jesson (appearing on behalf of the Council) jocularly remarked that he had been trying to get a similar meter, but had not been lucky enough up to the present. He pointed out that another meter had now been installed on Bennett's premises, and when tested was found to be quite correct. The claim was estimated on the quantity of gas consumed by the defendant in the corresponding period of the previous year. The Judge found for the plaintiffs for the amount claimed.

Smart Capture of Slot-Meter Thieves.

At the Tipton Police Court last week, two schoolboys were charged with stealing £1 1s. 3d. from a slot meter, the property of the gas department of the Tipton Urban Council. Mr. J. H. Stockdale, who prosecuted, remarked on the difficulty of finding those responsible for robberies from slot meters. Detective Davies, of the Great Western Railway police, Wolverhampton, said he was at the station when he saw the boys loitering about the platform, and putting pence into automatic machines. Then he noticed that their waistcoat pockets were full of pennies. They first of all said they had had the money from an aunt, but later they admitted breaking into a house. One lad was fined 40s., and the other was ordered to be birched. The Magistrates highly complimented Detective Davies on the smart manner in which he made the detection.

An Unlawful Gas Connection.

At the York Police Court last Friday, Ernest O. Arnold, a plumber, was ordered to forfeit £5, as the result of being charged by the York Gas Company with unlawfully laying a pipe communicating with other pipes conveying to his house gas belonging to the Company, without their consent. It was said that the communicating pipe was inserted in such a way that the gas did not pass through his slot meter. The defence was that, finding himself without coppers for the meter on returning home late in the evening, he had made the connection temporarily, only the night before the inspector saw it; but Mr. N. Crombie, prosecuting, drew attention to the significant fact that the defendant's gas consumption as registered had dropped very considerably. Arnold said this was explained by the fact that his house had been closed for some time.

MISCELLANEOUS NEWS.

GAS REGULATION ACT ORDERS.

The Director of Gas Administration has forwarded copies of the following further Orders made by the Board of Trade under section 1 of the Gas Regulation Act.

Richmond (Yorkshire) Corporation.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 16 6d. per therm.

After the declared date, the price of 14·2d. per therm shall be substituted for the price of 4s. 6d. per 1000 c.ft. mentioned in Article XXX. of the Richmond (Yorkshire) Gas Order, 1891.

After the declared date, the price of 16 6d. per therm shall be substituted for the price of 5s. 6d. per 1000 c.ft. mentioned in Article XXXII. of the Richmond (Yorkshire) Gas Order, 1891. (April 16.)

Settle Gas Company, Ltd.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 13d. per therm, and this price shall be substituted for the price of 4s. 7d. per 1000 c.ft. wherever it is mentioned in section 27 (price of gas) of the Settle Gas Order, 1896.

After the declared date, the word "therm" shall be substituted for "1000 c.ft." in paragraph (ii.) of Schedule B to the Settle Gas Order, 1896, and the words "fifth of a penny" shall be substituted for the word "penny" wherever it occurs in that paragraph. (April 16.)

Matlock Bath Gas Undertaking. Last Thursday, at a meeting of the Matlock Bath Urban District Council, Mr. Pritchard (Chairman of the Gas Committee) said they had had a satisfactory year. The department had now turned the corner, and possessed a balance which augured well for future success. It was the Committee's intention to submit a recommendation at the next meeting of the Council for reduction in the price of gas, both for household and power purposes. He believed that, when the accounts were presented, after having been audited, the Council would agree that Matlock Bath had at least one undertaking that was satisfactory to the ratepayers from the financial point of view.

Gas Testing in London.—At various times during the financial year 1922-23, the Public Control Committee of the London County Council have agreed to the joint appointment by the Council and other local authorities concerned of gas examiners testing at stations controlling gas distributed partly within and partly outside the county of London. The arrangement was that the expense should be shared by each authority in proportion to the amount of gas consumed within its area; the figures given by the Gas Referees forming the basis of calculation. At the time when these agreements were entered into, the amounts payable by the Council could not be determined with any degree of certainty, and consequently no provision was made in the maintenance estimates to meet the Council's liabilities. It is now necessary to make arrangements to meet accounts shortly falling due. It is estimated that these will amount to £200. As a set-off against this expenditure, various sums amounting to £372 are payable to the Council by other local authorities in respect of testing carried out by the Council's gas examiners of the gas supplied to their areas.

LOCAL AUTHORITIES AND THE GAS REGULATION ACT.

The final paragraph of the report which was given in last week's "JOURNAL" of the conference of representatives of municipal gas undertakings to consider the question of applying for Orders under section 1 of the Gas Regulation Act contained an error—the word "companies" appearing instead of "undertakings." The paragraph should have read:

"It was decided that it would be advisable to notify all gas undertakings that they must now consider and determine for themselves whether they would make application to the Board of Trade for an Order under section 1 of the Gas Regulation Act, and, if so, at what date."

METROPOLITAN GAS COMPANIES' OFFICIAL TESTINGS.

The reports of the Gas Referees for the past quarter of the official testings under the provisions of the Gas Regulation Act give the following average calorific values for the gas supplied by the Metropolitan Companies named.

Brentford Gas Company.—464·6 B.Th.U. (declared calorific value, 460 B.Th.U.).

Commercial Gas Company.—488·7 B.Th.U. (declared calorific value, 475 B.Th.U.).

Gas Light and Coke Company.—502·9 B.Th.U. (declared calorific value, 500 B.Th.U.).

South Metropolitan Gas Company.—565·1 B.Th.U. (declared calorific value, 560 B.Th.U.).

South Suburban Gas Company.—478·6 B.Th.U. (declared calorific value, 460 B.Th.U.).

Wandsworth, Wimbledon, and Epsom District Gas Company.—475·5 B.Th.U. (declared calorific value, 470 B.Th.U.).

In the case of the Wandsworth Company, it is reported that no trace of sulphuretted hydrogen was found at any testing place on any day during the quarter, except on one day at the testing place at Disraeli Road, Putney. The Chief Gas Examiner has certified in regard to this case that "the default of the undertakers was not substantial, and was not due to the careless conduct of the undertakers or their servants. I determine that no forfeiture be incurred by the undertakers in respect of such default."

THE PROPOSED HARROW AND BRENTFORD AMALGAMATION.

At the extraordinary meeting, already announced, of the Harrow and Stanmore Gas Company, to be held at No. 5, Great Winchester Street, E.C., at 11.30 next Monday, an agreement will be submitted for the sale of the undertaking to the Brentford Gas Company.

The agreement provides for the issue to holders of ordinary and preference stock and debenture stock of the Harrow and Stanmore Gas Company of ordinary or preference stock or debenture stock of the Brentford Gas Company, at the following rates:

For each £100 of ordinary stock of the Harrow and Stanmore Gas Company, £112 10s. "B" consolidated stock of the Brentford Gas Company.

For each £100 of 5 p.ct. consolidated preference stock of the Harrow and Stanmore Gas Company, £100 of 5 p.ct. preference stock of the Brentford Gas Company.

For each £100 of 4 p.ct. debenture stock of the Harrow and Stanmore Gas Company, £100 of 4 p.ct. debenture stock of the Brentford Gas Company.

For each £100 of 5 p.ct. debenture stock of the Harrow and Stanmore Gas Company, £125 of 4 p.ct. debenture stock of the Brentford Gas Company.

The adoption of the agreement by the proprietors is confidently recommended by the Directors, not only because the terms of purchase are regarded as being favourable to the proprietors, but also because, if the Harrow undertaking were to continue as an independent concern, it would be necessary at a very early date to incur a large amount of capital expenditure in enlarging and improving the Company's plant, which has now practically reached the limit of its capacity.

If the agreement be approved, it is proposed that the Brentford Gas Company shall apply to the Board of Trade under the Gas Regulation Act for a Special Order giving effect to the provisions o the agreement.

Electricity Breakdown at Halifax.—A forty-minutes electricity breakdown at Halifax last Friday night caused the usual tribulation among those sections of the community who pin their faith entirely to electric lighting. Theatres, picture houses, a good many shops, and some residences carried-on by the light of such candles as could be obtained; and the tramcars stopped. Shopkeepers whose premises were lighted by gas continued business merrily; and the great majority of householders, of course, knew nothing about the trouble.

Co-Partnership at Croydon.—The co-partnership scheme of the Croydon Gas Company was inaugurated on Jan. 1, 1909. In April, 1917, the rules were revised (to meet the cessation of bonus which would have occurred owing to the war increase of gas prices), and there was formed in connection with it a co partners' pension fund, which all then co-partnership employees voluntarily decided to join. For new entrants, it became a condition of co-partnership. Members of the old workmen's superannuation fund and of the then existing staff superannuation fund came under the operation of the revised pension rules. In April, 1922, the scheme was again revised, and the pension fund extended to make provision for widows and orphans; and the new rules have now been issued.

DRONFIELD COUNCIL AND THE GAS COMPANY.

Suggestion for Sheffield to Supply in Bulk.

There was an interesting discussion at the last meeting of the Dronfield (Derbyshire) Urban District Council regarding the application of the Dronfield Gas Company to the Board of Trade for permission to increase their prices.

Mr. J. W. MATHEWMAN submitted a report stating that, according to the figures presented by the Company at a recent Board of Trade inquiry, there was in the year 1913 a leakage of 12½ p.ct., and in 1921 there was still gas unaccounted for to the amount of 10 p.ct. The plea put forward by the Company was that they were losing money; but he urged that from 1915 to 1921 the Company made a profit every year. In 1921 a loss of £507 was reported. During that year, however, the Company spent £1492 out of revenue on renewal of mains and services—an outlay which he contended ought to have been met out of capital. The Council's representatives at the Board of Trade inquiry drew the attention of the Inspector to the fact that the Company had for some years been meeting certain charges out of revenue which ought to have been paid out of capital; and this policy had increased the cost of production. The present price of gas was 1s. 0·2d. per therm; and he asserted that the Sheffield Gas Company were now supplying to ordinary consumers at 8d. per therm, and at 6d. per therm to those who were taking gas in quantity. He suggested that the Sheffield Gas Company, who had their mains very close to Dronfield, might be willing to supply 27 million c.ft. of gas in bulk a year to the Dronfield Company at the reduced price. If the Dronfield Company could purchase gas in bulk at 8d. per therm, they could then sell it at 1s. per therm, and so make a handsome profit, as he calculated they would be able to save £1000 a year which was now being expended out of revenue on mains. At the inquiry, the Board of Trade Inspector frankly told the Company that if they could buy gas cheaper than they could produce it themselves, it was their duty to do so.

The CLERK (Mr. H. N. Lucas) explained that the question of Dronfield getting a supply of gas in bulk from the Sheffield Gas Company at a cheaper rate was discussed twenty years ago, and at that time it was stated that it would be necessary to lay an 18-in. main a distance of 8 miles to Dronfield. This would necessitate an expenditure of some thousands of pounds, so that even if the Sheffield Gas Company accepted the scheme, the gas at Dronfield would be no cheaper.

Mr. BAGGALEY thought if the Sheffield Gas Company could supply Dronfield with gas in bulk at the cheap rate suggested, it would be a good thing if the Sheffield Company were to purchase the Dronfield Gas-Works.

The CLERK said that, in the past, the Dronfield Gas Company had not taken advantage of the maximum price they were entitled to charge; and there was no reason to believe they would do so in the future.

Mr. FOSTER urged that they were there to protect the Dronfield ratepayers against being charged too much for gas. The Directors of the Dronfield Gas Company might be perfectly honest in their business methods; but the Council had no guarantee that, if they obtained permission to increase the price, they would not put on the maximum charges.

Mr. BAGGALEY (as a Director of the Dronfield Gas Company) said it was very painful for him to have to sit and listen to such criticism of the actions of his fellow-Directors, who, he asserted, were quite as honest as the members of the Council. It had been insinuated that he had an axe to grind on the Council, and that he had the interests of the Gas Company more at heart than the affairs of the town generally. This insinuation he strongly repudiated. At the last meeting of the Directors, he suggested that the price of gas should be reduced as soon as possible.

Eventually a resolution was passed requesting the Board of Trade to withhold their sanction to the Company's application until it was definitely ascertained that Dronfield could not purchase gas in bulk from Sheffield at a cheaper rate than they themselves could produce it. Further, it was decided to write to the Dronfield Gas Company stating that the Council would use their influence to induce the Sheffield Gas Company to supply gas in bulk to the Dronfield area.

GAS LIGHTING IMPROVEMENT COMPANY.

[From the "Petroleum Times."]

Nearly a year ago now, when commenting upon the report for 1921 of the Gas Lighting Improvement Company—which, by the way, refines and distributes motor spirit and benzine, &c., the refineries and works being at Pacific Wharf, West Ham—the opinion was expressed in these columns that Gas Lighting Improvement £1 shares were a promising investment. The shares, which are quoted in the Official List of the Stock Exchange prices of commercial, industrial, &c., securities, could then be bought around par; the present price being around 26s. Further, an interim dividend of 2½ p.ct. for 1922 was declared in October last. The accounts issued a year ago disclosed a loss of £35,592, which compared with a profit of £48,608 for 1920. No ordinary dividend was paid for 1921; the adverse results being brought about in a large measure by the fall in prices of oil products. The issued capital comprises 15,000 £1 7 p.ct. cumulative preference and 235,000 £1 ordinary shares; the total authorized capital being £250,000. The Directors, after paying the usual preference dividend, followed a conservative policy, though it would have required only £23,500 to pay a 10 p.ct. ordinary dividend, and a credit balance of no less than £62,620 was carried forward to 1922, on account of which an interim dividend of 2½ p.ct. has been distributed. The carry-forward was after taking into account a refund of £25,851 for excess profits duty. The accounts showed the Company's financial position to be a strong one, especially in view of the comparatively small issued capital, liquid assets being over £230,000, against creditors of nearly £120,000. Included in the former figure was £30,000 cash, £9500 War Loan, £99,000 stocks, £69,000 debtors, and £28,000 represented shares held in oil concerns, which included shares in the

Phoenix Oil and Transport—the Managing-Director of the Gas Lighting Improvement also being a Director of the Phœnix. It may be mentioned that the Gas Lighting Improvement Company was registered as far back as Dec. 10, 1888, and paid a dividend as high as 30 p.ct. for 1913, and substantial dividends up to 1920, when 15 p.ct. was paid.

Since writing the above, the report of this concern for the year to Dec. 31, 1922, has come to hand, and discloses a very satisfactory financial position. After deducting the year's dividend on the preference shares, there is a balance of £87,822; and the Directors now recommend a final dividend of 5 p.ct. on the ordinary shares, which, with the interim dividend paid on Nov. 1 last, makes a total of 7½ p.ct. The carry-forward to the current year is as much as £70,197—the equivalent of nearly 30 p.ct. of the present issued ordinary capital. It may be mentioned that for some months past there have been persistent rumours of important developments pending in connection with this undertaking. Gas Lighting Improvement £1 shares, around 26s., should be retained. Apart from anything else, it will be appreciated that, on the past year's results alone, a much larger dividend than 7½ p.ct. could have been paid.

TRADE NOTES.

"A. & M." Pressure-Wave Controllers.

Consequent upon the continued success of the "A. & M." pressure-wave automatic controllers, the Borough of Burton-on-Trent have decided to instal a further hundred of them.

Underfeed Stoker Company.

A lengthy list of the recent more important sales of the Underfeed Stoker Company, Ltd., of Coventry House, South Place, London, E.C., includes forty-five travelling grate stokers, twenty-two underfeed stokers, an ash conveyor, and a number of arches.

Meldrum Centrifugal Gas-Scrubbers.

An order has recently been received by Messrs. Meldrums, Ltd., of Timperley, near Manchester, for two of their newly perfected patent centrifugal gas-scrubbers for use in one of the largest gas and coke-oven plants in the kingdom. This scrubber is, we are informed, creating much interest among gas engineers and others, owing to its great efficiency, perfect atomization of the washing medium, and low power required.

"Vislok" Safety Triple Lock Nut.

The sole makers and patentees of the "Vislok" safety triple lock nut—Messrs. Vislok, Ltd., of No. 1, St. Bride's House, Salisbury Square, London, E.C.—are so confident of the satisfactory action and general reliability of their speciality, that they offer to send a free sample lock nut for testing purposes under applicants' own conditions. It has, indeed, been proved by over seven years' practical work; and there are millions now in use. The "Vislok" nut automatically makes three separate but simultaneous and interdependent locks by the one movement of an ordinary spanner. It is British made and British owned, and is stocked in all sizes from ¼ in. to 4 in. A great number of gas undertakings have already adopted it; and many more will doubtless do so, in view of the fact that it evidently gives satisfaction under the conditions that prevail in gas-works. The makers have brought to our notice literature on the subject which may be commended to prospective users; but special attention may be drawn here to the statement that with every "Vislok" supplied, it is guaranteed: That "Vislok" cannot be shaken loose or off. That "Vislok" can be used and re-used; that it never requires inspecting or tightening-up; and that it will last as long as any machinery on which it is fitted. That "Vislok" cannot damage the bolt thread or its own thread; and that it cannot elongate the bolt. That "Vislok" once locked is locked for ever, until the user unlocks it; and that no vibration or shock can unlock it. That "Vislok" is the cheapest proposition for securing a bolt, because it saves the money, the time, and the labour hitherto spent in inspecting, tightening-up, and renewing ordinary nuts, and averts all danger of accidents and stoppages owing to nut trouble.

Società Italiana per il Gas.

The report and accounts of the Company (who supply with gas Turin and various other towns) for the year 1922, which were submitted to the shareholders last month, showed that the quantity of gas sold by the different works is increasing again to pre-war proportions. In 1914, the amount sold was 40,200,000 cubic metres; in 1920, 18,900,000 cubic metres; and in 1922, 27,100,000 cubic metres. This recovery must be extremely gratifying to the General Manager of the Company (Signor Ugo Dellacasa), as well as to the shareholders. The growth shown in the consumption on the present occasion is ascribed in the first place to the improved conditions of the country, to a reduction in the price of gas, and to the sending-out of a better quality. In Turin the selling price of gas has been gradually brought down. The concession for Turin expires on Dec. 31 of this year; and the municipality have notified that they will take over the concern, in accordance with the Law of Municipalization. In the meantime, the Company have opened-up negotiations for a new concession, though they are as yet unable to express any opinion as to what will be the result of their efforts in this direction. On May 31 last the concession for the supply of gas and electricity to the town of Savona expired; but the gas-works have since been provisionally carried on. The electricity plant has, however, been taken over by the Municipality. In July, the concession for the gas-works at Monza similarly expired; and these works have also been kept going, in the hope of obtaining a new concession. A favourable opportunity for doing so having arisen, the Board have purchased the block of buildings forming their offices in Turin, as well as some additional land adjacent to the gas-works. The year 1922 closed with a profit of 1,381,123 lire; and after providing the usual reserves, there was at disposal the sum of 1,200,000 lire, which was sufficient to pay a dividend of 30 lire per 250 lire share, and leave a small balance to carry forward.

THE NORTH-EAST COAST COAL TRADE.

From Our Own Correspondent.

On the Newcastle market during the past week, features of interest have been few and far between. Since the previous week, the situation has undergone practically no change. Perhaps there have been rather more inquiries round for the second half of the year; but this is only natural with the July-December period drawing near. These have, however, mostly been with the object of sounding the market, and buyers are still holding off in the hope of eventually obtaining cheaper coals than they could by buying now. Collieries are unwilling to discount current quotations to any considerable extent, maintaining as they do that there is just as much chance of the market holding as there is of its falling away. And they have enough coal sold at good prices for the second half to run the risk.

French railways have invited tenders for May delivery; and there is more than enough business offering for prompt and up to the end of June to maintain prices at the top. Generally speaking, cargoes can only be put together for April and May by means of odd lots from various sources; and fancy prices are asked.

Coking is still in greatest demand, up to 37s. 6d. being done for best qualities. The price of best quality gas and Wear specials is at least 35s., and seconds 32s. 6d. f.o.b.; and at these figures supplies are exceedingly scarce. Bests would quote about 32s. 6d. for July-December, and it is doubtful whether they would be keen to consider much less than this.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From a Local Correspondent.

According to experts in the coal trade, gas concerns will probably have to pay increased prices when renewing their contracts during the coming summer; the idea being generally prevalent that the increase will be about a shilling per ton.

With the quieter trade for gas coal for home purposes, there is rather more offering for export. In the case of household coal, supplies are just about meeting the demand, which is not excessive owing to the mildness of the weather. There would probably have been a surplus but for export activity. There appears to be no materially increased demand from industry, though in certain quarters producers have increased their prices to the user by amounts ranging from 1s. to 2s. 6d. per ton.

The export section continues very active, and collieries generally report sales for all descriptions for some months ahead. In view of the anticipated increase in wages, prices have generally risen—in some cases by 5s. per ton—during the past six weeks. Yorkshire furnace coke is not in the same urgent request as before, and can be purchased at 47s. 6d. per ton f.o.b. Hull, as compared with 65s. to 70s. four or five weeks ago. For Lancashire furnace coke, the price at the ovens is 28s. per ton.

COAL TRADE IN THE MIDLANDS.

From Our Local Correspondent.

Firmness is still the leading characteristic of the gas-coal market. It is stated that as much as 23s. a ton is being paid for unscreened coal at West Coast pits which are favourably situated as to shipment; and this is one of the arguments used in negotiations with the big consumers concerning future supplies. As against this, however, the freedom with which deliveries are coming forward, and the progress that is being made in overtaking arrears, inspires buyers at home with the belief that the export demand has passed its meridian. While there is a concerted insistence, in some districts, on a substantial advance in contract prices from midsummer, buyers in the Midlands hold to the opinion that in this event the collieries which now put such a high estimate on the strength of the market will moderate their tone. Most of the big undertakings in this area are simply watching developments. They show no anxiety whatever to open negotiations respecting new contracts. It is considered significant that in the few cases where buyers have deemed it wise to make sure of their future supplies they have been able to do so at advances materially less than the 2s. 6d. and upwards which some Derbyshire, Yorkshire, and North Staffordshire collieries name as a basis for negotiation. Contracts have been renewed at an advance of 1s. In one case—which, however, is stated to be exceptional—supplies have been offered at an increase of 6d. over current contract rates. There is an easier tone in regard to coke, both furnace and gas. Signs of the shipping demand having relaxed are reported.

Modern Gas Lighting.

With a view to co-operating with the local gas-fitters, builders, architects, and housing authorities in giving the fullest possible information in regard to up-to-date methods of utilizing gas, and discussing the best way of fixing appliances in order that the consumer may secure the most efficient service, the Bristol Gas Company have arranged a series of lectures, the first of which was recently given by Mr. J. W. Lofts, of Messrs. W. Sugg and Co., who dealt with "Modern Gas Lighting," illustrating his various references to up-to-date examples by lantern slides. The use of the modern type of incandescent burner, with suitable fittings, globes, and shades, in the home, the workshop, and the public building, was fully dealt with; and the lecturer emphasized the importance of gas-fitters discouraging the use of cheap and "shoddy" types of burners, which are not economical, and are a frequent source of complaint by the gas consumer of inefficient lighting. The principles of the super-heated low-pressure burner were fully explained; and examples of interior and exterior lighting by it were given. Successful installations of street lighting were shown on the screen. There were in attendance many representatives of the gas-fitting trade connected with the local associations and technical classes, while several gas undertakings in the districts were represented by members of their staff. A discussion followed the lecture, and a hearty vote of thanks to Mr. Lofts was passed.

STOCK MARKET REPORT.

THE tendency of markets on the Stock Exchange last week varied with some rapidity. The first factor was the Budget, which was generally approved and which sent prices up liberally. This was succeeded by the inevitable profit-snatching, which sent them down again; but this was remedied by a recovery before the close. Home Government issues were in high favour, and Colonials did well. Indians were weaker. Home Rails fluctuated. The Foreign Market was better on the whole. A lively demand for Industrials was a feature.

Business in the Gas Market was quite active, and the tone was very firm; the steady advance in quotations, now in operation for some weeks, being continued. In Londons, Gas Light ordinary and maximum rose ½, and the two Commercials 1 each. In Suburban and Provincials, Alliance and Dublin rose 3, Bournemouth "B" ½, Brighton and Hove original 3, ditto "A" 3½, Liverpool preference 1, Newcastle 1, three Sheffields 1 each, South Suburban 1, and Tottenham "B" 2. Abroad, Continental Union and ditto preference 2 each, and Monte Video 1.

The following transactions in gas during the week were recorded: Brighton and Hove original 170, Commercial 4 p.ct. 96, 97½, 98½, Croydon max. div. 82, European 84, 88, 88½, Gas Light ordinary 97⅜, 98½, 98⅝, 98½, ditto 3½ p.ct. maximum 66⅜, 67⅜, ditto 4 p.ct. preference 79½, ditto 3 p.ct. debenture 62½, 63, ditto 10 p.ct. bonds 195, Imperial Continental 168, ditto 3½ p.ct. debenture 76, 77, Liverpool 7 p.ct. preference 103, Newcastle 81⅜, Oriental 99, 100, Primitiva 10s., ditto 5 p.ct. preference 38s. 6d., 38s. 9d., South Metropolitan 98¼, 99, 99½, ditto 5 p.ct. preference, 98, ditto 6½ p.ct. debenture 107, South Suburban 100½, Tottenham "B" 104, 105, Tuscan 5s., Wandsworth new 102½, 102½, Barnet "A" 155½, 156, ditto "B" 155½, 156, Wandsworth 5 p.ct. preference 99, Metropolitan of Melbourne shares 8 5/16. On Tuesday, Bombay 100s., British 4 p.ct. debenture 80, 80½, Commercial 3½ p.ct. 98½, Croydon sliding-scale 101, 101½, ditto max. div. 83, European 8½, 8 11/16, Gas Light ordinary 97½, 98, 98⅛, 98⅜, 98½, ditto 3½ p.ct. maximum 67, ditto 3 p.ct. debenture 63, Imperial Continental 167, 168½, Primitiva 38s. 9d., 40s., South Metropolitan 99, 99½, South Suburban 101, Wandsworth new 102, 102½, ditto 5 p.ct. preference 99, Barnet "A" 155, 156, ditto 4 p.ct. debenture 75½, 76. On Wednesday, Bombay 97s. 6d., Bournemouth "B" 11⅜, 12, Cape Town 6½, European 8 19/32, Gas Light ordinary 97⅜, 98, 98⅛, ditto 4 p.ct. preference 79½, Imperial Continental 167½, 168, 168½, Liverpool 7 p.ct. preference 103, 104, South Metropolitan 98½, 99½, 99½, 99¾, Swansea 6½ p.ct. debenture 103⅜, Tottenham "B" 106, Broadstairs 4 p.ct. debenture 70, 70½, Croydon 4 p.ct. debenture 77½, 79, Grays and Tilbury "B" 7⅛, 7 1/16, ditto 4 p.ct. debenture 73, 73½, Redhill 5 p.ct. "B" 72½, 73, Romford 4½ p.ct. debenture 81½, 82, Southend 5 p.ct. new 81, 81½, ditto 5 p.ct. "B" 76, 76½, Uxbridge 5 p.ct. 95, 95½, ditto 4 p.ct. debentures 76, 76½, Worthing 78½, 79. On Thursday, Alliance and Dublin 62½, 62⅝, Gas Light ordinary 98¼, 98½, 98¾, 98½, 99, Oriental 100, Primitiva 10s. 6d., ditto 5 p.ct. preference 39s, South Metropolitan 98¾, 99⅜, ditto 6½ p.ct. debenture 107, Wandsworth new 102½, ditto 5 p.ct. preference 99, East Grinstead 7 p.ct. "C" maximum 8⅜, 8 11/16, Kingston-on-Thames 90, Romford 4 p.ct. debenture 74, 75½. On Friday, Aldershot 74½, ditto 5 p.ct. "A" 88½, Alliance and Dublin 62½, 62⅝, 62½, 63, 63½, 64½, Bombay 100s., Brighton and Hove "A" 130, 131½, 132, Croydon max. div. 84½, European 8½, Gas Light ordinary 98⅛, 98⅜, 99, 99¼, 99⅜, 99½, ditto 3½ p.ct. maximum 67½, ditto 3 p.ct. debenture 63½, Imperial Continental 167, Liverpool 7 p.ct. preference 104, 105, Primitiva 15s., ditto 5 p.ct. preference 39s. 3d., 39s. 6d., South Metropolitan 98⅜, 99, 99½, 99½, 99⅜, ditto 5 p.ct. preference 97½, 98, ditto 3 p.ct. debenture 62½, South Suburban 101, 101⅜, Tottenham "B" 105, 106, Kingston-on-Thames 90½, Southend 4 p.ct. debenture 74, Wandsworth 5 p.ct. preference 99.

In the Money Market, conditions varied from day to day. Moderate demand appeared in mid-week, but soon gave way, and by Friday money could be had for 1 p.ct. Silver varied, but ultimately closed at about opening figures. The Bank of England rate was 3 p.c., as fixed on July 13.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S TRANSACTIONS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Transactions.
£			p.c.					
131,978	Stk.	Feb. 22	—	5%	Aldershot 5 p.c. max. C.	..	74—79	74
190,492	,,	,,	4	4%	Do. 4 p.c. Pref.	..	68—73	...
1,551,868	,,	Apl. 5	2½	5%	Alliance & Dublin Ord.	59—64	59—62	61—66
374,000	,,	Jan. 11	4	4%	Do. 4 p.c. Deb.	76—79	60—65	...
280,000	5	Oct. 19	7½	4/-	Bombay, Ltd.	5¾—6¼	4¾—5¼	97/6—100/-
100,000	5	Feb. 22	16	8/-	Bournemouth Gas and Water { 5 p.c.	..	11—12	...
383,110	10	,,	7	7/-	Bournemouth Gas and Water { B 7 p.c.	15—15½	11½—12½	11¾—12
115,000	10	,,	6	6/-	Bournemouth Gas and Water { Pref. 6 p.c.	13¼—14	10—11	...
162,065	—	Dec. 29	—	4%	Bournemouth Gas and Water { 4 p.c. Deb.	..	71—76	...
992,045	Stk.	Feb. 22	14	6½/-	Brentford A Consolid.	261—266	100—105	...
734,920	,,	,,	11	6½/3	Do. B New	204—209	97—102	...
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	85—90	...
221,400	,,	Dec. 14	4	4%	Do. 4 p.c. Deb.	91—93	78—83	...
214,775	,,	Mar. 8	11	11%	Brighton & Hove Orig.	208—213	173—178	170
244,200	,,	,,	8	8½%	Do. A Ord. Stk.	154—159	130—135	130—132
1,272,500	Stk.	Feb. 22	5	5%	Bristol 5 p.c. max.	..	90—93	...
570,000	20	Mar. 22	12½	20/-	British	44—45	38—40	...
10,000	10	Dec. 29	—	7/-	Do. 7 p.c. Pref.	..	12—13	...
120,000	Stk.	June 29	4	4%	Do. 4 p.c. Deb. Stk.	88—90	75—80	80—80½
220,335	,,	Dec. 29	4	4%	Buenos Aires 4 p.c. Deb.	85—87	55—58	...
100,000	10	Nov. 2	—	—	Cape Town & Dis., Ltd.	1¼—2¼	6¼—7¼	6¼
100,000	10	Oct. 19	—	—	Do. 4½ p.c. Pref.	4—6	6—7	...
100,000	Stk.	Dec. 29	4½	—	Do. 4½ p.c. Deb. Stk.	70—75	72—77	...
237,860	,,	,,	—	7½%	Cardiff 7½ p.c. Deb.	..	107—112	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	...
1,513,280	,,	Mar. 8	5/9/4	60/-	Commercial 4 p.c. Stk.	106—108	97—100	96—98½
560,000	,,	,,	5½	60/-	Do. 3½ p.c. do.	103—105	97—100	98½
475,000	,,	Dec. 14	3	3%	Do. 3 p.c. Deb. Stk.	69¼—71¼	55—60	...
800,000	,,	Dec. 15	4	—	Continental Union, Ltd.	76—79	27—32	...
200,000	,,	Dec. 14	7	4%	Do. 7 p.c. Pref.	115—118	57—62	...
660,000		Mar. 8	—	6%	Croydon sliding scale.	..	100—103	101—101½
284,975		,,	—	5%	Do. max. div.	..	82—85	82—84½
492,270	Stk.	,,	6	4½%	Derby Con. Stk.	123—125	..	...
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	..	...
209,000	,,	Apl. 5	—	5%	East Hull 5 p.c. max.	..	..	...
2,002,180	10	Jan. 25	10	5/0	European, Ltd.	17½—18	8½—9½	8¾—8½
16,546,120	Stk.	Feb. 8	4/17/4	52/-	Gas { 4 p.c. Ord.	98—102	97½—99½	97½—99½
2,600,000	,,	,,	3½	35/-	Gas { 3½ p.c. max.	76—79	66—68	66½—67½
4,062,235	,,	,,	4	4%	Light { 4 p.c. Con. Pref.	96—99	78—80	79½
4,761,930	,,	Dec. 14	3	3%	and { 3 p.c. Con. Deb.	72½—74½	61—64	62½—63½
130,000	,,	Dec. 11	10	10%	Coke { 10 p.c. Bonds	..	..	195
—	—	—	—	—	Coke { 7½ p.c. Ilford Deb	..	..	...
82,500	,,	Mar. 8	5	65/7½	Hastings & St. L. 5 p.c.	..	92—97	...
258,740	,,	,,	3½	50/7½	Do. 3½ p.c.	87—89	75—78	...
70,000	10	May 18	11	7½%	Hongkong & China, Ltd.	16½—16¾	6—7	...
86,600	Stk.	Mar. 8	9	9½%	Hornsey 7 p.c.	..	135—140	...
1,976,000	,,	Nov. 16	9	£5	Imperial Continental	150—160	165—170	167—168½
404,800	,,	Feb. 8	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	75—78	76—77
235,242	,,	Mar. 8	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	93—98	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord.	..	..	...
600,000	,,	Mar. 22	—	7%	,, 7 p.c. Pref.	..	103—105	103—105
165,736	,,	Feb. 22	7/5/6	80/-	Maidstone 5 p.c.	..	107—112	...
63,480	,,	Dec. 29	—	3%	Do. 3 p.c. Deb	..	53—58	...
73,000	5	June 29	6	6%	Malta & Mediterranean Met. of Melbourne { 4½ p.c. Deb.	4¼—4½	3¼—3½	...
100,000	100	Apl. 5	4½	4½%	Malta & Mediterranean Met. of Melbourne { 4½ p.c. Deb.	99—101	97—100	...
541,920	Stk.	Nov. 30	4	4%	Monte Video, Ltd.	11½—13	55—60	...
1,875,892	,,	Feb. 22	4½	5½%	Newcastle & Gateh'dCon.	98¼—99½	82—83	81½
850,166	,,	,,	—	4%	Do. 4 p.c. Pref. Stk.	..	76—78	...
529,705	,,	Dec. 29	3½	3½%	Do. 3½ p.c. Deb.	82—83	68—69	...
13,000	10	Aug. 26	—	7/6	North Middlesex 10 p.c.	..	..	...
55,940	10	Mar. 8	7/14/0	7/8½	,, ,, 7 p.c.	14—15	10¼—11¼	...
300,000	Stk.	Nov. 30	8	8%	Oriental, Ltd.	117—122	97—102	99—100
188,120	Stk.	Dec. 29	—	72/6	Plym'th & Stonh'se 5 p.c.	..	94—99	...
60,000	50	Mar. 8	13	65/-	Portsea Island, B	128—131	98—103	...
100,000	50	,,	12	60/-	Do. C	118—121	95—102	...
290,069	5	—	8	—	Primitiva Ord.	5¼—6	⅞—1	10/—15/-
499,960	5	—	5	—	Do. 5 p.c. Pref.	4¼—5	1¼—2¼	38/6—40/-
521,600	100	Nov. 30	4	4%	Do. 4 p.c. Deb.	91—93	70—73	...
600,000	Stk.	Jan. 25	4	4%	Do. ,, ,, 1911	..	55—58	...
346,198	,,	Dec. 29	4	4%	River Plate 4 p.c. Deb.	85—87	55—58	...
150,000	10	Mar. 22	6	6/-	San Paulo { 6 p.c. Pref.	10¼—11	5¼—6	...
125,000	50	July 3	5	5%	San Paulo { 5 p.c. Deb.	47—49	36—38	...
135,000	Stk.	Mar. 22	10	5%	Sheffield A	223—224	96—98	...
209,984	,,	,,	10	5%	Do. B	222—224	96—98	...
523,500	,,	,,	10	5%	Do. C	220—222	96—98	...
133,201	Stk.	Sept. 15	4	4%	Shrewsbury 5 p.c.	..	..	...
90,000	10	Nov. 2	9	7%	South African	10¼—11¼	7—9	...
6,609,895	Stk.	Feb. 22	5/4/0	60/-	South Met. Ord.	111—113	98—101	98—99¾
250,000	,,	Jan. 11	—	5%	Do. Red. Pref.	..	96—98	97¼—98
1,895,445	,,	,,	3	3%	Do. 5 p.c. Deb.	72¼—74¼	61—63	62½
734,000	,,	Mar. 8	—	6¾%	Do. 6½ p.c. Deb.	..	105—107	107
91,500	,,	Feb. 22	8½	8½%	South Shields Con. Stk.	157—159	115—117	...
1,087,795	,,	,,	6	6%	S'th Suburb'n Ord. 5 p.c.	114—116	99—102	100½—101½
368,837	,,	Dec. 29	5	5%	Do. 5 p.c. Deb. Stk.	116—118	93—98	...
647,740	,,	Nov. 2	5	7%	Southampton Ord.	99—102	85—88	...
121,275	,,	Dec. 29	4	4%	Do. 4 p.c. Deb. Stk.	..	68—73	...
250,000	,,	Mar. 8	—	70/-	Swansea 7 p.c. Pref. Stk.	..	102½—104½	...
200,000	,,	Dec. 29	—	6½%	Do. 6½ p.c. Deb. Stk.	..	103—105	103½
120,000	,,	Feb. 22	—	7½%	Tottenham { A 5 p.c.	135—138	123—128	...
782,275	,,	,,	6	6%	Tottenham { B 3½ p.c.	115—117	102—107	104—106
181,255	,,	Dec. 14	4	4%	District { 4 p.c. Deb.	87—89	75—80	...
258,251	Stk.	Mar. 22	5	5%	Tynemouth 5 p.c. max.	108½—109	90—92	...
30,000	,,	Feb. 22	8½	87/6	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	151—156	130—135	...
255,636	,,	,,	6½	72/6	Do. B 3½ p.c.	129—134	115—120	...
128,075	,,	,,	—	61/3	Do. C	..	100—105	...
140,865	,,	,,	—	61/3	New Ordinary	..	100—105	102½—102½
352,000	,,	,,	6½	68/9	Wimbledon 5 p.c.	117—122	109—114	...
98,000	,,	,,	6½	73/9	Epsom 5 p.c.	121—126	115—120	...
88,416	,,	Dec. 29	3	3%	3 p.c Deb. Stk.	66—69	56—59	...

SALE OF STOCKS AND SHARES.

By Order of Trustees.

GAS AND WATER STOCKS AND SHARES

in the

GAS LIGHT AND COKE COMPANY.
WANDSWORTH, WIMBLEDON, AND EPSOM DISTRICT GAS COMPANY,
SOUTH SUBURBAN GAS COMPANY,
TOTTENHAM DISTRICT LIGHT, HEAT, AND POWER COMPANY,
HERNE BAY GAS COMPANY, LTD.,
GT. YARMOUTH WATER-WORKS COMPANY,
SOUTHEND GAS COMPANY,

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GASHOLDER AND TANK CONSTRUCTION AT THE SUTTON GAS-WORKS.

1,000,000 cubic feet capacity.

By F. SOUTHWELL CRIPPS.

Price 10/6 net.

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CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *April* 23.

In the absence of business on the tar products market, there is no change to report in prices. Pitch and creosote are in keen demand; but supplies are short. Makers are busy with deliveries of tar for road work.

Tar Products in the Provinces.

April 23.

The average values for gas-works products during last week were: Gas-works coal tar, 111s. to 116s. Pitch, East Coast, 180s. to 182s. 6d. f.o.b. West Coast—Manchester, 175s. to 180s.; Liverpool, 177s. to 181s.; Clyde, 177s. 6d. to 182s. 6d. Benzole 90 p.ct., North, 1s. 6d. to 1s. 6½d.; crude 65 p.ct. at 120° C., 1s. to 1s. 0½d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 8d. to 1s. 8½d. Toluole, naked, North, 1s. 11d. to 2s. nominal. Coal tar crude naphtha in bulk, North, 8½d. to 9d. Solvent naphtha, naked, North, 1s. 8d. to 1s. 10d. Heavy naphtha, North, 1s. 6d. to 1s. 8d. Creosote, in bulk, North, liquid, 8½d. to 8¾d.; salty, 7½d. to 8d. Scotland, 7d. to 7½d. Heavy oils, in bulk, North, 9d. to 9½d. Carbolic acid, 60 p.ct., 4s. to 4s. 2d. prompt, 3s. 10d. to 4s. forward. Naphthalene, £15 to £16; salts, £6 to £8, bags included. Anthracene, "A" quality, 4d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Southend Gas Company Debenture Issue.—Tenders must be sent in by 11 o'clock on Friday next, April 27, for £40,000 of 5 p.ct. perpetual debenture stock in the Southend Gas Company which Messrs. A. & W. Richards, of No. 37, Walbrook, E.C., have been instructed by the Directors to offer for sale. The minimum price is £97 10s. per £100, at which the yield is £5 2s. 7d. p.ct. The money is required for extensions of the works, mains, &c. An agreement has been entered into by the Company to acquire from the Corporation of Southend-on-Sea the gas undertaking supplying Leigh-on-Sea.

A Big Rhine Gas Enterprise.—A Press Association telegram from Cologne states that Herr Thyssen is taking a 99 years' lease of the Bonn Gas-Works, and is negotiating with the Municipality to supply Konigswinter, Godesberg, Beuel, Honnef, and other towns on the opposite bank of the Rhine. He is desirous of acquiring all gas undertakings from Cologne to Mainz, and to monopolize the entire supply over an enormous area on similar lines to those in the Elberfeld-Barmen district. The existing plants are insufficient to cope with the expected demand. Herr Thyssen is therefore seeking land adjacent to the Rhine for the erection of gigantic producing plant with water facilities for the transport of coal and the export of coke and other bye-products.

Haywards Heath Gas Company.

At the annual general meeting of the Company—presided over by Mr. E. C. Charleton—the Directors reported a balance to credit of profit and loss account of £4094, out of which they recommended the payment of the dividend on the 6½ p.ct. redeemable preference stock, and a final dividend at the rate of £5 17s. 6d. p.ct. per annum on the 5 p.ct. consolidated stock, for the half year to Dec. 31 last, making £5 11s. 3d. p.ct., less income-tax, for the year, and leaving a balance of £2366 to be carried forward. The sales of gas showed an increase of 5 12 p.ct. for the year over those of 1921. The price of gas was twice reduced during the year; and a further reduction of 1d. per therm is being made as from the March quarter meter readings. Dealing with the revenue account, the Chairman pointed out that the cost of manufacture had been decreased by about £1500, which was a satisfactory item. On the other side, there was an increase of nearly £500 in the sale of gas. The balance of £4094 to credit of profit and loss account compared with £2576 last year. The quality of the gas was in every test well above the declared calorific value. Commenting upon the satisfactory character of the accounts generally, he referred to the excellent services rendered by Mr. A. E. Whitcher (the Engineer, Manager, and Secretary) and his staff. The smooth working and excellent results for the year had been considerably due to them; and the shareholders might again safely leave the conduct of the business in Mr. Whitcher's capable hands. The report and accounts were adopted; and Mr. Whitcher, replying to a vote of thanks, said the staff were a very happy family, which fact had contributed to the results shown.

Output Increased at Blackpool.—It was reported to the Blackpool Gas Committee last week that the output for the year ended March 31, was 841,197,000 c.ft., compared with 827,125,000 c.ft. in the preceding year—an increase of 14,072,000 c.ft., equivalent to 1·7 p.ct. The Committee passed a vote of condolence with the widow and family of the late Mr. William Chew, the Gas Engineer and Manager. It was decided to advertise for a successor.

Dorman Long Bye-Product Plant.—Sir Hugh Bell, Bart. (Acting Chairman), presiding at a meeting of shareholders of Messrs. Dorman, Long, & Co., at Middlesbrough, on Tuesday of last week, said it was proposed to consolidate five joint companies, under the style of Dorman, Long, & Co. The Company had at their Redcar works, he said, a bye-product coke plant which, in course of time, would be increased. Very considerable advantage was being derived from the bye-products. The crude materials from all the Company's works were taken to their Clarence Works for further treatment. They had there a very extensive tar distillation plant; and they were now among the largest makers of benzole in the kingdom. Before long he believed they would produce more benzole than any other firm. The Company have increased their capital to £12,000,000, by the authorization of a new issue of 5½ p.ct. first mortgage redeemable debenture stock.

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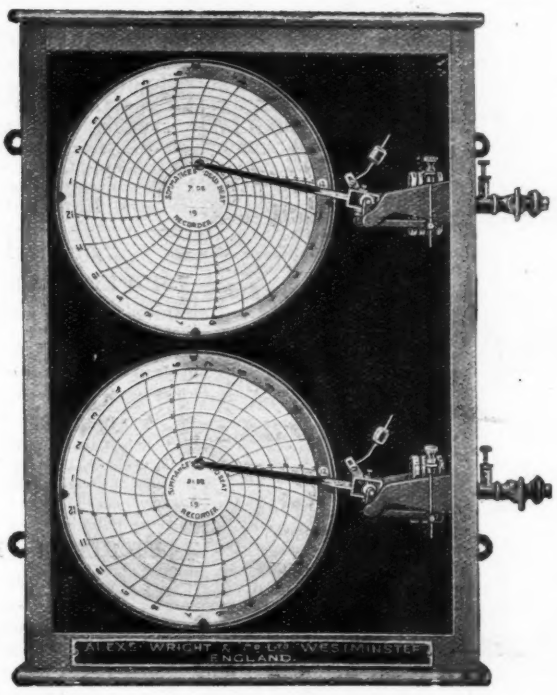

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At a Ripley (Derbyshire) auction sale, Messrs. Lee, Son, and Cope sold 37 original ordinary £5 shares (fully-paid) in the Ripley Gas Light and Coke Company, Ltd. The prices realized were £8 12s. 6d., £8 13s., and £8 15s. per share.

The Hebden Bridge and Mytholmroyd Gas Board have received notification of a general reduction in the wages of gas workers; but locally the employees have just put in an application for increased wages. The matter has been referred to the Emergency Committee of the Board.

The Bradford Corporation Gas Committee, in response to a letter from the Bingley District Council drawing attention to a petition by ratepayers in the Crack Lane district of Wilsden, asking for a gas supply, have decided to carry-out necessary works there at an estimated cost of £490. The area concerned is in the Bingley urban district, but in the Bradford gas supply limits. The scheme, it is understood, has received the sanction of the Bradford Corporation Finance Advisory Committee, whose approval is now necessary for all expenditure.

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